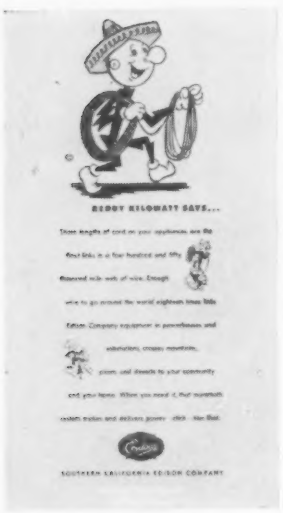
ELECTRICAL WEST

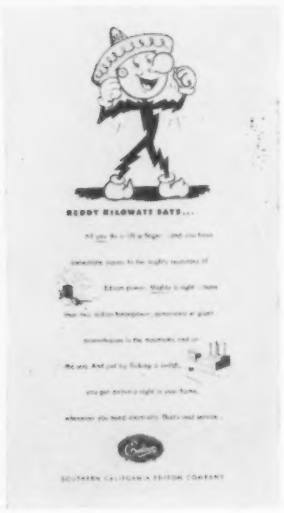
December 1948
25 cents

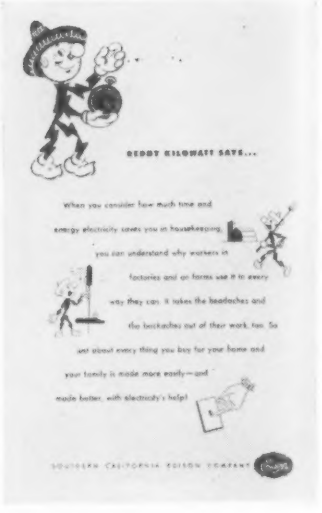
Releasing Human Potential, Page 67

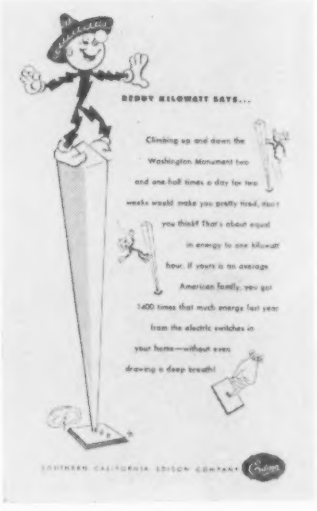
Appliances, Page 99

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.








REDDY KILOWATT SAYS...
Climbing up and down the Washington Monument two and one-half times a day for two weeks would make you pretty tired, don't you think? That's about equal in energy to one kilowatt hour. If yours is an average American family, you get 1400 times that much energy last year from the electric switches in your home—without even drawing a deep breath!

GOOD BUSINESS!

Periodically, in newspapers everywhere in Edison territory, advertisements like these sell electric service. Attractive, readable, these messages are an important part of the Edison promotional program. They tell a punch-packed story — and that is good for our business.

They do more than that! "Freedom from housekeeping drudgery" and "more comfort, convenience and pleasure" are merely phrases, until customers translate them into electrical appliances. Washers, vacuum cleaners, radios, television sets and all the others are the very real realities — and *that* is good for *your* business!

Edison SOUTHERN CALIFORNIA EDISON COMPANY

NOW... a revolutionary luminaire with new principle that controls glare

Here is a brand new luminaire—that introduces a brand new approach to light control. Designated as G-E Form 109, it has been designed primarily for burning mercury lamps in traffic-artery lighting —where high visibility, high utilization efficiency —and maximum driver comfort—are important.

With this luminaire, the light source is well up in the reflector, completely shielded from drivers. The light, directed downward in an asymmetric pattern by the ovate reflector, is then *lifted* by the prismatic refractor—to give a sharp, accurate cut off at 20 degrees below the horizontal on the street side, 25 degrees on the driver-approach side. The entire globe is uniformly illuminated so that brightness is relatively low. Glare is held to the lowest levels ever achieved in mercury lighting—with practically *all* light placed where it is needed for best visibility.

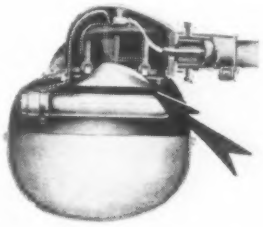
C. H. Rex, General Electric design engineer for street and highway lighting equipment, points out that the* light-lifting *Holophane refractor is spun-sealed to the* light-directing *ovate reflector.

Burns *either* FH-1 *or* EH-1 lamps *horizontally*

The new Form 109 can be used with *either* the 16,000-lumen FH-1 or 21,000-lumen EH-1 mercury lamp and also can be used with large filament lamps. Both mercury lamps are burned horizontally. The arc of the long-life, lower-priced FH-1 lamp is magnetically centered in its tube to assure the same lamp life as when burned vertically.

We believe that this new luminaire is one of the most significant forward steps in street lighting since we introduced mercury lighting 13 years ago. You'll want Bulletin GEA-5142, which gives further information.

Apparatus Department, General Electric Company, Schenectady 5, N. Y.



Arrow points to small coil magnets over arc stream which center the arc in the arc tube—permitting horizontal burning of the FH-1 mercury lamp.

GENERAL ELECTRIC

452-77

Are you tieing in with the NEMA plan to give America better street lighting?

DECEMBER
1948

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents Copyright. Sixty-first year of publication.

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
James H. McGraw, Jr., Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Balzari, Publishing Counselor
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STARTING A NEW YEAR

Why advertise and promote in a time of shortages? It is a temptation to ask this question. The answer will be given next month by an executive whose philosophy has brought the finest industry teamwork in the West through a cooperative league in which all participate. In the January issue engineers will find interest in the Tygh Valley - Cove line, recently completed by Pacific Power & Light Co. and the Bridge River plant of the B. C. Electric whose generators will assist the power-hungry Northwest through this winter. Contractors and others will get details of a new lighting technique at the remodeled and enlarged Macy's store in San Francisco. The second part of the report on built-in radiant electric heating, begun in this issue, will appear next month with observations as to its operating characteristics. There will be other items of value in engineering, lighting and wiring, sales and association pages of the next number. The February number again will present the statistics of the industry, its record during the past year and its promise during 1949. It will be the thirtieth Annual Review and Statistical number. From it readers in all phases of the industry will find data of value and interest.

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Cover: A new form of Christmas tree is being raised on many a roof in the West, in preparation for television. It is the special antenna required for good signal strength. This picture shows an RCA crew from the L. J. Meyberg Co. making an installation.

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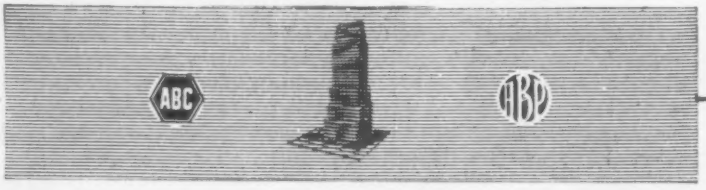
Cleveland (15) ... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) ... W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) ... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ... Tom Carmody, 68 Post St., DO. 2-4600



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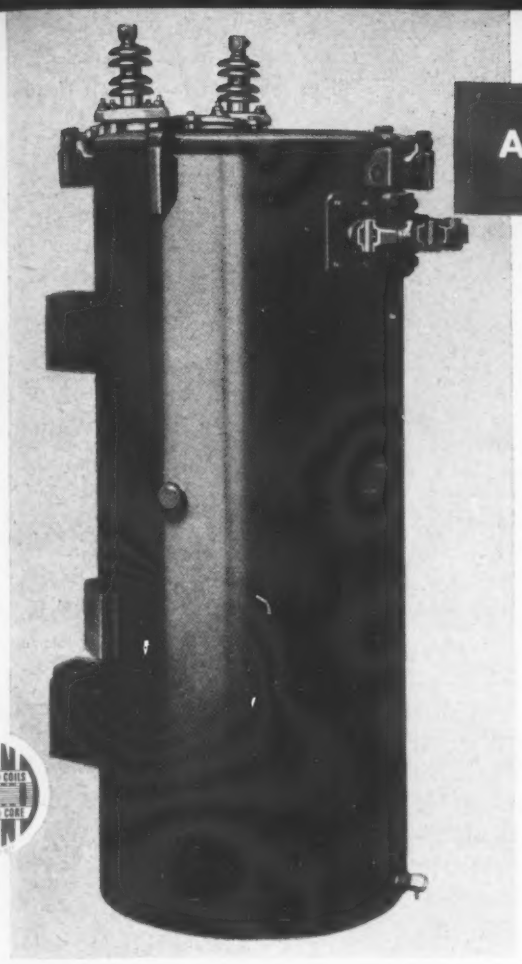


All wound core transformers are NOT alike!

Here's the basic difference in

L-M Round-Wound Transformers

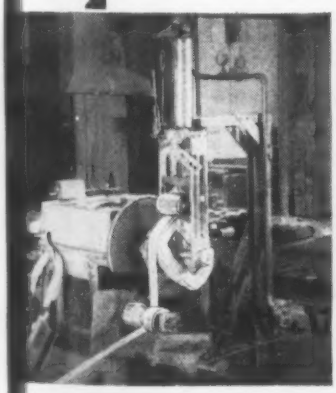
It's not just having a "wound" core that counts. *How* it is wound, of what material, and what is done with the core *after* winding—such factors make a tremendous difference in that transformer's performance.

L-M Round-Wound transformers are a distinctly different product, with a different design—and give distinctly different results.

The core is wound—yes. Then it is annealed, to remove winding strains. It is NOT cut, unwound, or taken apart and reassembled. It is left *undisturbed* after annealing—so there won't be any gaps, air spaces, or new strains introduced through rehandling or reassembling. This is possible only because Line Material winds the round coils right onto the finished and undisturbed core. *That is the basic difference.* And you can tell the difference—in performance.

Let us prove it—we'd like to tell you the complete story. In the meantime, get a copy of the illustrated booklet that describes the design and the method of manufacture—Bulletin 16-G-1. ***Write Line Material Company, Transformer Division, Zanesville, Ohio,*** for a copy—and tell us when you'd like to have one of our Field Engineers call.

How they're made makes the difference



Core is wound under tension, *with* the grain, of continuous strip high grade cold rolled electrical silicon steel (1). The elliptical core provides a continuous flux path, with no air gaps, no wasteful corner sections—a practically perfect core shape. Cruciform cross section, approximating the round, is electrically ideal, and provides oil passages between core and coils.

Here's the secret of L-M's exclusive Round-Wound method. Split gears are clamped around the core leg (2), and rotated by the L-M-designed winding machine, so the gears revolve about the leg. We actually wind the coil onto the core—right where it will be in the finished transformer. *That's* why we don't have to cut or unwind the core after annealing.

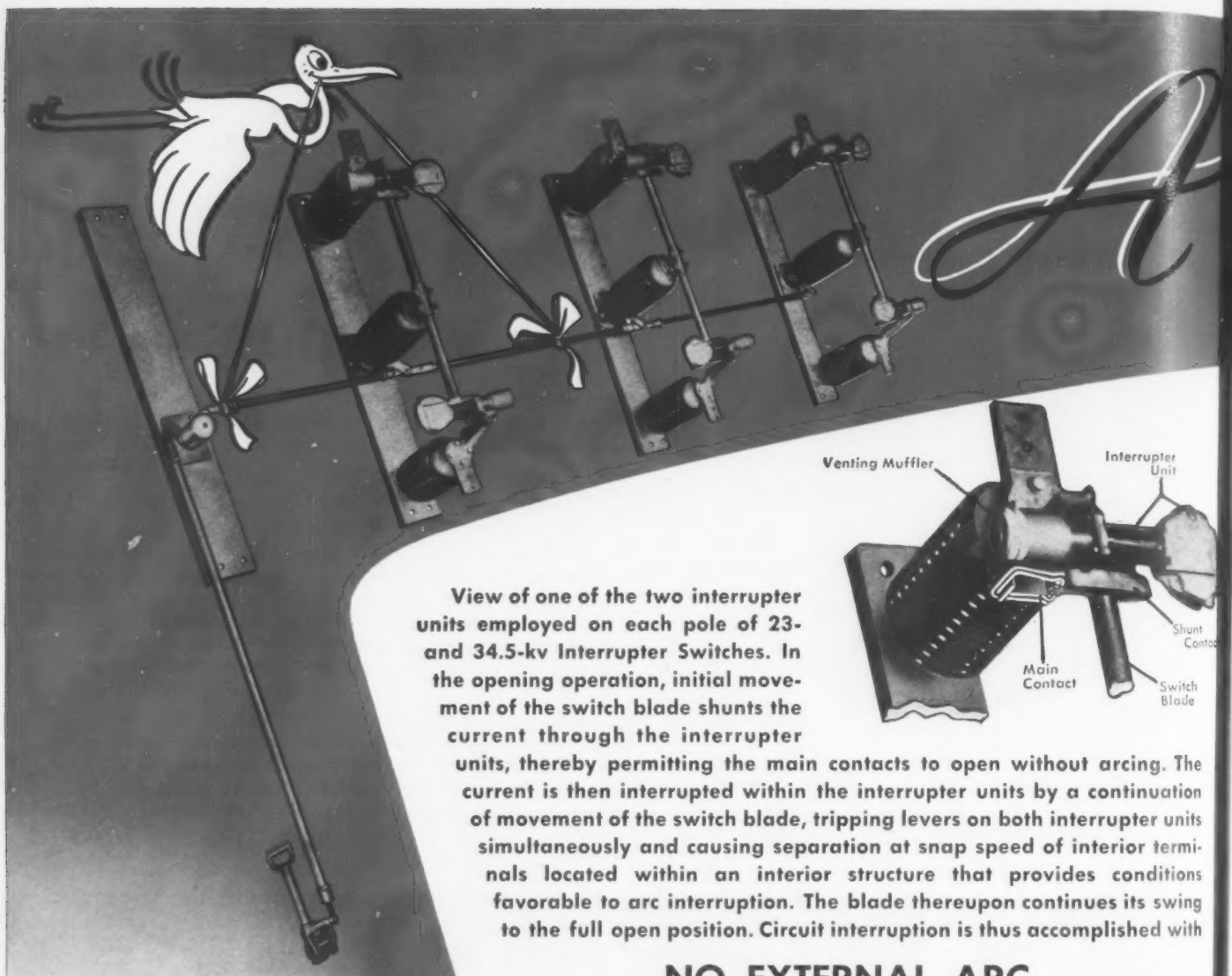
The core, with gears in place, is now clamped into the winding machine. Gears on the machine mesh with the split gears on the core, rotating them about the core leg, which is stationary. Onto the flanges of the split gears we wind heavy insulating paper (3), forming a tube that becomes the permanent base for the coil, and also insulates the windings from the core.

Coils are now wound onto this tube (4). Oil duct spacers are wound into larger coils for extra cooling. Uniform winding speed and tension assure a tight, evenly wound coil, closely fitted to the core. These round coils have inherently high short circuit strength. They need no malleting into shape; insulation is undamaged; and they have high impulse strength.

LINE MATERIAL Transformers

Complete Coordinated Equipment for All Distribution Requirements

LM



View of one of the two interrupter units employed on each pole of 23- and 34.5-kv Interrupter Switches. In the opening operation, initial movement of the switch blade shunts the current through the interrupter units, thereby permitting the main contacts to open without arcing. The current is then interrupted within the interrupter units by a continuation of movement of the switch blade, tripping levers on both interrupter units simultaneously and causing separation at snap speed of interior terminals located within an interior structure that provides conditions favorable to arc interruption. The blade thereupon continues its swing to the full open position. Circuit interruption is thus accomplished with

NO EXTERNAL ARC

the principal feature distinguishing S & C Alduti Interrupter Switches.

Closed and open views of one of the main contacts used on 23- and 34.5-kv Alduti Interrupter Switches. High pressure "line" contact engagement between slivered contact surfaces is established with a rocking, wiping, toggle action which insures a clean, corrosion-resistant connection, and which disengages with a rolling, thrusting-out action.

TYPICAL APPLICATIONS

where 7.5- and 15-kv Alduti Interrupter Switches are already rendering meritorious service

Switching of both load and magnetizing currents on the primary of transformer banks

Switching of charging currents of large capacitor banks up to 2000 kvar on 2400-volt circuits and 3000 kvar on 4160- to 13,800-volt circuits

Breaking charging currents on overhead and underground feeders

Sectionalizing loaded distribution circuits

Switching plant feeders

Interrupting exciter current on feeder regulators

Throw-over from preferred to emergency circuits

And, when combined with S & C Power Fuses, short circuit protection is also provided.

S&C ELECTRIC

Arrived!!!!

23- and 34.5-kv INTERRUPTER SWITCHES

Again stepping out in front in the new approach to interrupting load, magnetizing, and charging currents... making an epochal advancement into the higher voltage range... S&C announces 23,000- and 34,500-volt Alduti Interrupter Switches to supplement this line, previously manufactured only in 7,500- and 15,000-volt ratings.

The new higher voltage interrupter switches are not merely projections from the lower voltage units but are essentially new developments, embodying valuable new features. Extensive laboratory and field tests have clearly demonstrated their applicability in:

(a) Sectionalizing loaded subtransmission circuits up to 600 amperes—the continuous current and interrupting rating of the switches—as well as breaking charging currents on overhead and underground feeders where conventional horn gap switches are inadequate.

(b) Switching 3-phase transformer banks up to 15,000 kva at 23,000 volts and 20,000 kva at 34,500 volts, either magnetizing or load currents.

In addition to performing the above functions, Alduti Interrupter Switches offer installation advantages in that they permit: (1) closer phase spacings, (2) simplification of structure, and (3) housing in a metal enclosure, although enclosures by no means are necessary in outdoor locations.

A new supplement to Bulletin 202A gives catalog information on the new 23- and 34.5-kv Interrupter Switches, and your inquiries are invited.

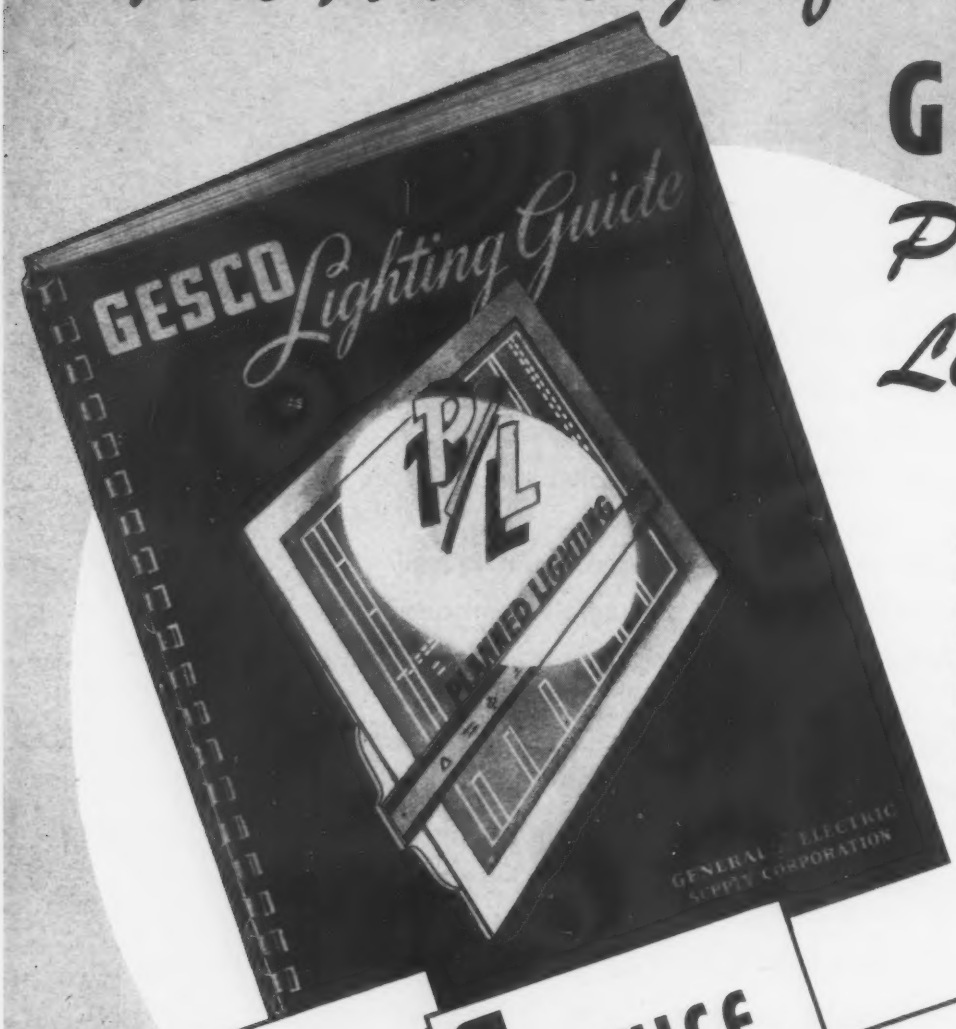
COMPANY 4425 RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS, U.S.A.

Formerly SCHWEITZER & CONRAD, INC.

R. E. Cunningham & Son, Los Angeles; George E. Honn Co., San Francisco; Thos. S. Wood, Seattle

Take Advantage of

GESCO *Planned Lighting*



One of many aids available to GESCO customers, the "Lighting Guide" offers an entirely new approach to lighting problems. It is sectionalized and designed to give complete, accurate data on every phase of lighting.

PRODUCT

GESCO supplies the best available electric products—lamps, lighting fixtures, power apparatus, wiring materials. G-E and other dependable manufacturers serve as your source of supply.

SERVICE

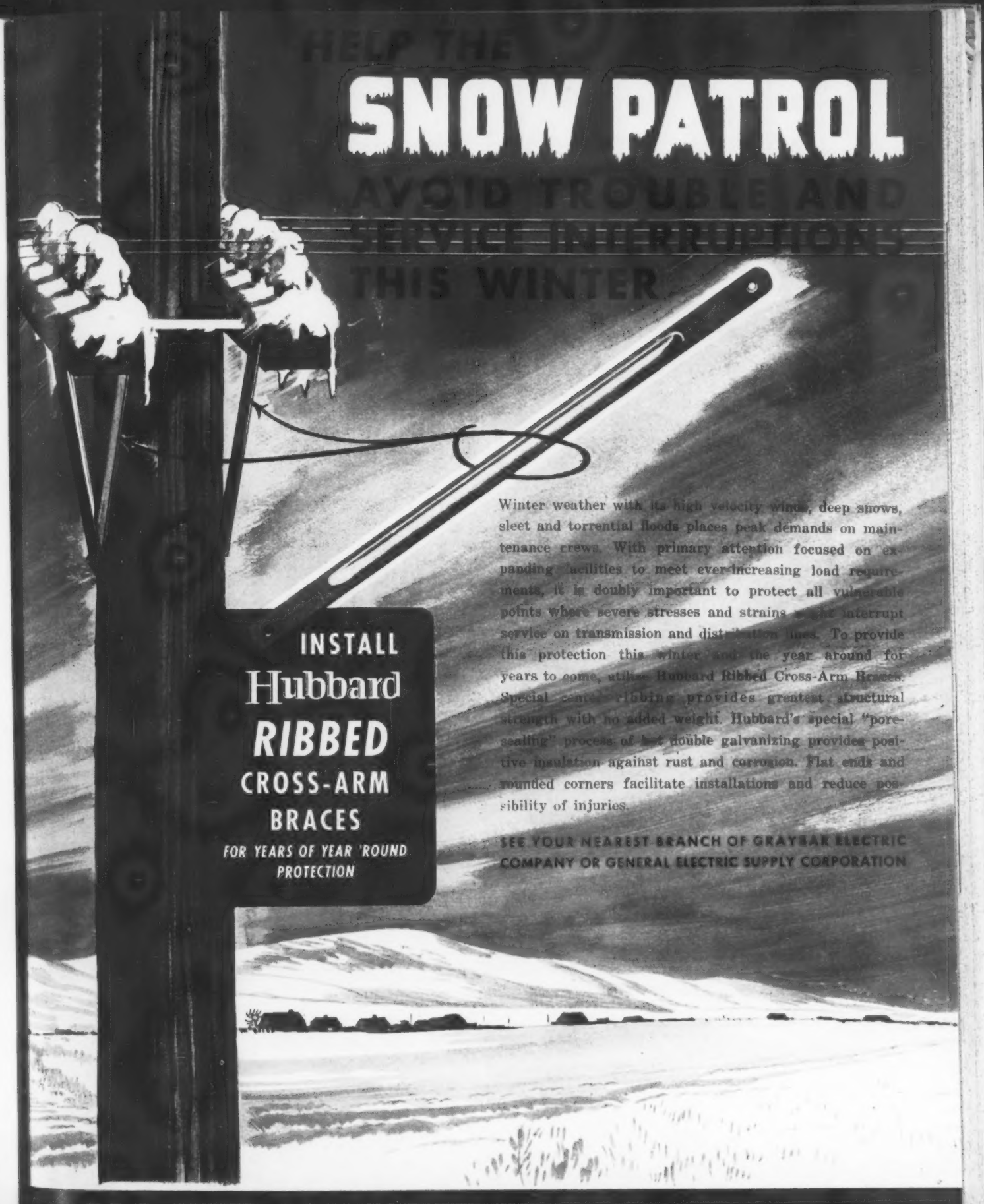
GESCO warehouse inventories are your assurance that your every need can and will be met. GESCO deliveries and factory shipments are prompt.

COUNSEL

GESCO's trained specialists work with plant engineers, electrical contractors, and maintenance departments. With your GESCO representative, they assure a solution to your lighting problems.

GENERAL ELECTRIC SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE


HELP THE
SNOW PATROL
AVOID TROUBLE AND
SERVICE INTERRUPTIONS
THIS WINTER
INSTALL
Hubbard
RIBBED
CROSS-ARM
BRACES
FOR YEARS OF YEAR 'ROUND
PROTECTION
Winter weather with its high velocity winds, deep snows, sleet and torrential floods places peak demands on maintenance crews. With primary attention focused on expanding facilities to meet ever-increasing load requirements, it is doubly important to protect all vulnerable points where severe stresses and strains might interrupt service on transmission and distribution lines. To provide this protection this winter and the year around for years to come, utilize Hubbard Ribbed Cross-Arm Braces. Special center ribbing provides greatest structural strength with no added weight. Hubbard's special "pore-sealing" process of hot double galvanizing provides positive insulation against rust and corrosion. Flat ends and rounded corners facilitate installations and reduce possibility of injuries.
SEE YOUR NEAREST BRANCH OF GRAYBAR ELECTRIC COMPANY OR GENERAL ELECTRIC SUPPLY CORPORATION

HUBBARD AND COMPANY

Pittsburgh OAKLAND, CALIFORNIA Chicago

ANG THE LOAD ON HUBBARD HARDWAR

Have you seen the new

"ELEMEX" CAPACITORS?

- with L-M "Lifetime" solder-sealed bushings
- in 15 *AND 25* kvar sizes in standard voltage ratings
- at NO increase in price

now in stainless steel tanks

another L-M "first"!

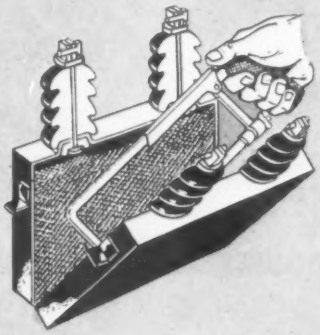
complete coordinated equipment
for all distribution requirements

Now you can cut capacitor installation and maintenance costs. You never need to paint stainless steel—ever! There's no paint to scrape off to get a good ground. Tank is "Hydis" treated—colored for high heat dissipation. "Paragroove" Connectors and uniform terminal elevation above hangers make it easier to connect leads, or to replace or mix 15's with 25's! Outstanding 5-year field service record. Negligible failure rate. *Not one* breakage in shipment. *Not one* leaky bushing! That's L-M "ELEMEX" shunt capacitors! They really make the economies of capacitors economical!

Constantly growing demand has doubled our production facilities every six months. A new and larger plant now makes it possible to give you prompt delivery.

Note all these features. Ask the L-M Field Engineer to give you all the details, to show you an actual production unit sawed in two so you can see this new "Hydis" treated steel for yourself. Ask him for your copy of the new bulletin on the new "ELEMEX" capacitors in stainless steel tanks.
You will want to place your order right away. If you are in a hurry, wire collect . . .
Line Material Company, Milwaukee 1, Wisconsin.

Look at this tank!



The L-M Field Engineer has an actual production capacitor sawed in two—ask him to show you the new "Hydis"-treated stainless steel tank, the L-M "Lifetime" sealed bushing construction, the "Paragroove" connectors, and explain the many other unusual features of "ELEMEX" capacitors.

NEW — Exclusive L-M "Hydis" surface treatment—colored for high heat dissipation. Part of the metal—not a paint!

NEW — L-M "Lifetime" solder-sealed bushings keep air out, keep "ELEMEX" liquid in—permanently.

NEW — 25 kvar sizes, as well as 15 kvar, in standard voltage ratings.

NEW — Same terminal elevation above hanger for both 15 and 25 kvar sizes in each voltage rating. The 25's are two or three inches longer *below* the hanger—instantly identified from the ground. No change in leads when 15's are replaced or mixed with "ELEMEX" 25's. All sizes same width and thickness, fit same hanger bolts.

NEW — Increased production facilities to meet demand. Prompt delivery now if you order promptly!

PROVED — Low Unit Stress! Conservative design assures long life, proved by 5-year field record.

PROVED — "Paragroove" Connectors, another L-M "first." Wire is just dropped in and clamped; no crossing leads; no loose parts; 15's quickly replaced with 25's.

PROVED — Safer. Discharge resistors across every pack or parallel group of packs.

PROVED — *Individual* testing of packs, tanks, and completed capacitor before, during and after impregnation assures uniformity, long life.

PROVED — Continuous individual evacuation, drying, and capillary impregnation with "ELEMEX" non-inflammable dielectric. Continuous testing assuring precise control of power factor and capacitance of each individual capacitor—exclusive L-M research developments.

LINE MATERIAL Capacitors

LM

The a-c secondary network system is recognized as *the* lowest-cost system for providing heavy load areas with the highest-quality service—both in voltage and in continuity. It is normally the most economical high-quality service system for business sections of cities having underground distribution, and of the order of 50,000 or more in population—and may often pay its way in smaller towns as well.

But—to realize the full savings possible with networks, you must use standardized network equipment. For example:

YOU SAVE ON INSTALLATION when you specify

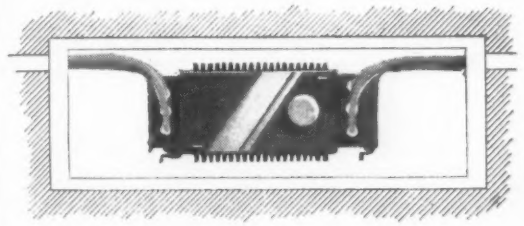
STANDARDIZED NETWORK EQUIPMENT

NARROWER VAULTS G-E standardized network equipments are designed for vaults with widths of only 4½ feet—or less. Such vaults can almost always be built between building line and curb—the best location from the standpoint of real estate, construction, and servicing. Such narrow vaults reduce appreciably the problem of roof-slab construction.

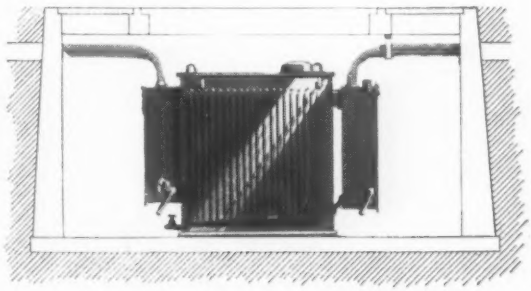
REASON: G-E standardized network equipments require servicing only from the two ends. The network protector is located on the low-voltage end—can be slid out on rails from its housing for ready inspection or adjustment. All transformer accessories, as well as the high-voltage switch, are located at the high-voltage end—liquid-level gages, thermometer, pressure test valves, tap changer, drain valves, sampling valves and filter press valves can all be inspected or operated from this end.

SHALLOWER VAULTS With G-E standardized network equipments, vaults can be as much as one or two feet shallower—saving substantially in excavating and construction costs. Vault drainage is also simplified—though either the vault type or the subway type transformer can be completely submerged without damage or interruption of service.

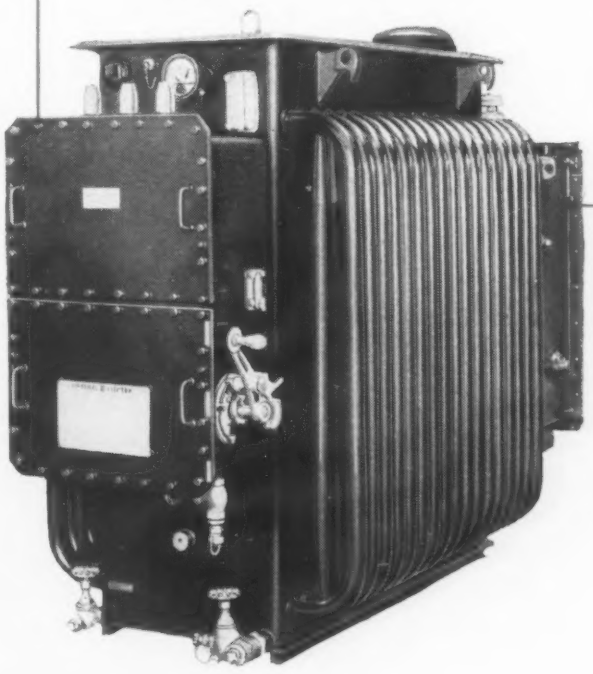
REASON: With G-E standardized network equipments, both high- and low-voltage cable terminals are well below the top of the transformer. Even in these shallow vaults there is room for large-radius bends of cables.



With manhole openings at both ends, vault need be only 14′ long, 4½′ wide for 500-kva transformers.



A clear depth of 7′ below roof slab will provide sufficient room for maintenance and inspection.



PLUS

FASTER DELIVERY G-E standardized network transformers and protectors can be supplied on shorter delivery.

LOWER PRICE G-E standardized network units are appreciably lower in price than non-standard designs.

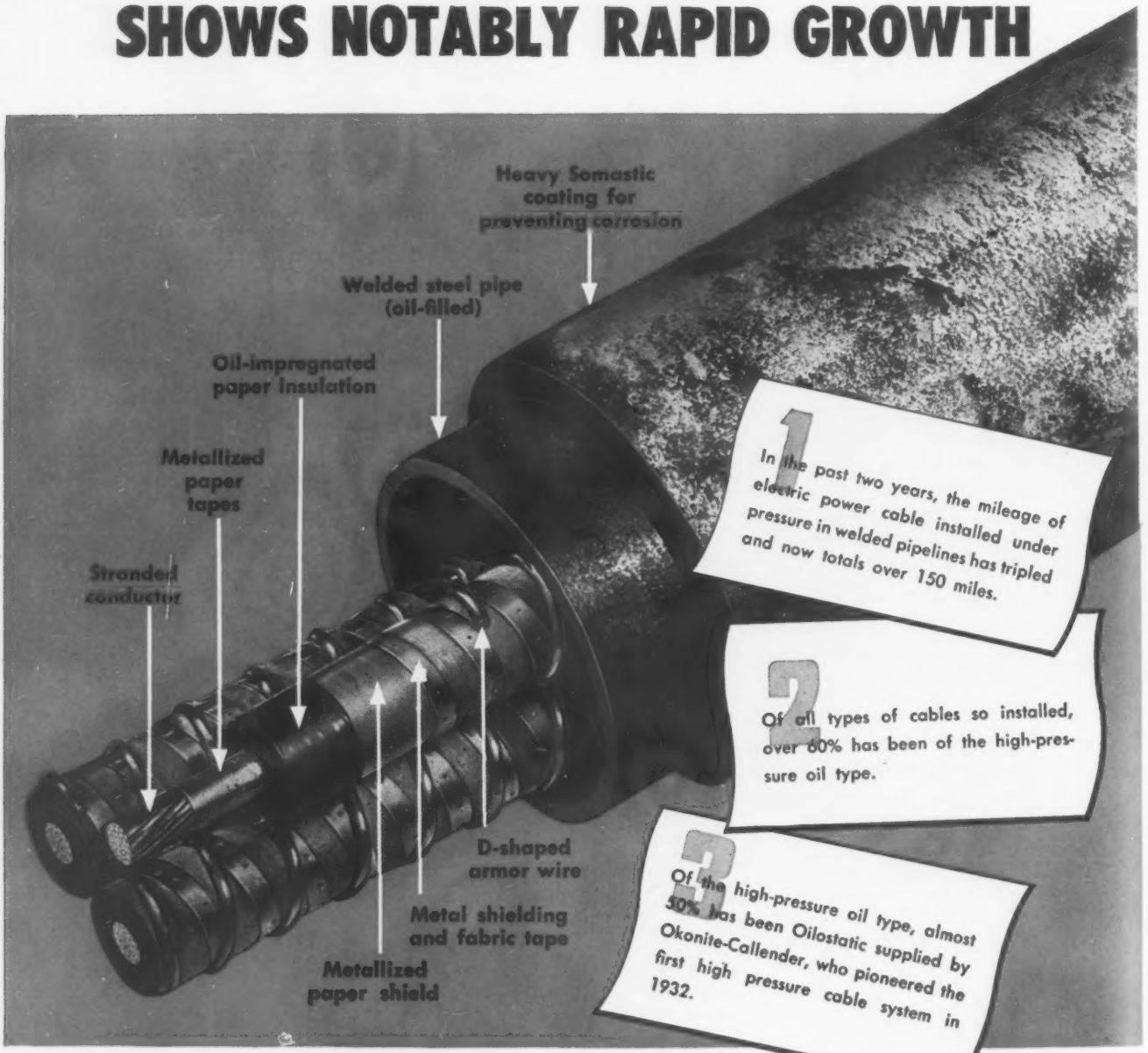
LESS MAINTENANCE G-E standardized network equipments incorporate all maintenance-saving developments which the industry recognizes as desirable—gaskets eliminated by welding cover and switch box to transformer, accessories grouped for maximum convenience, all bushings externally removable without opening the main transformer tank, dust-tight relays which can be easily removed for checking, and then replaced.

An inquiry to your G-E Representative or a letter to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*, will bring you information on standardized network equipment—and just what should be specified to secure the savings which this equipment makes possible. Bulletin GEA-5024 describes standardized network transformers; GEA-2017 describes G-E network protectors.

GENERAL ELECTRIC

402-76

ELECTRICAL TRANSMISSION BY PIPELINE SHOWS NOTABLY RAPID GROWTH


Heavy Somastic coating for preventing corrosion
Welded steel pipe (oil-filled)
Oil-impregnated paper insulation
Metallized paper tapes
Stranded conductor
D-shaped armor wire
Metal shielding and fabric tape
Metallized paper shield
1 In the past two years, the mileage of electric power cable installed under pressure in welded pipelines has tripled and now totals over 150 miles.
2 Of all types of cables so installed, over 60% has been of the high-pressure oil type.
3 Of the high-pressure oil type, almost 50% has been Oilostatic supplied by Okonite-Callender, who pioneered the first high pressure cable system in 1932.

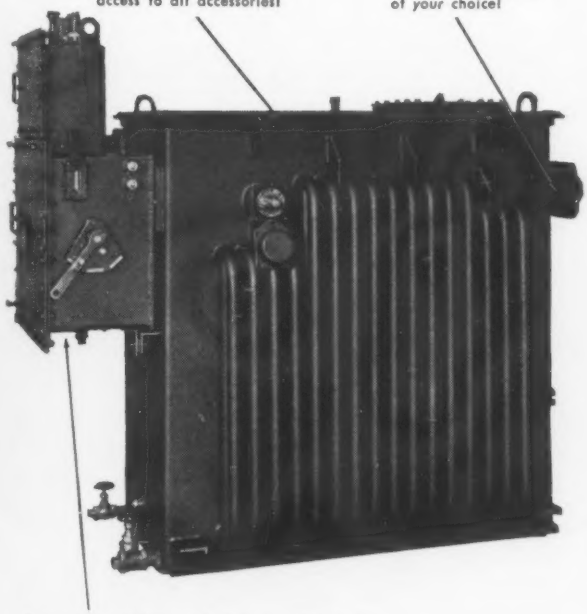
The Oilostatic* Transmission System consists essentially of paper-insulated cable installed in a welded steel pipe and maintained in direct contact with oil at 200 psi pressure. The combination of constant saturation and high oil pressure gives Oilostatic cable maximum stability and dielectric strength.

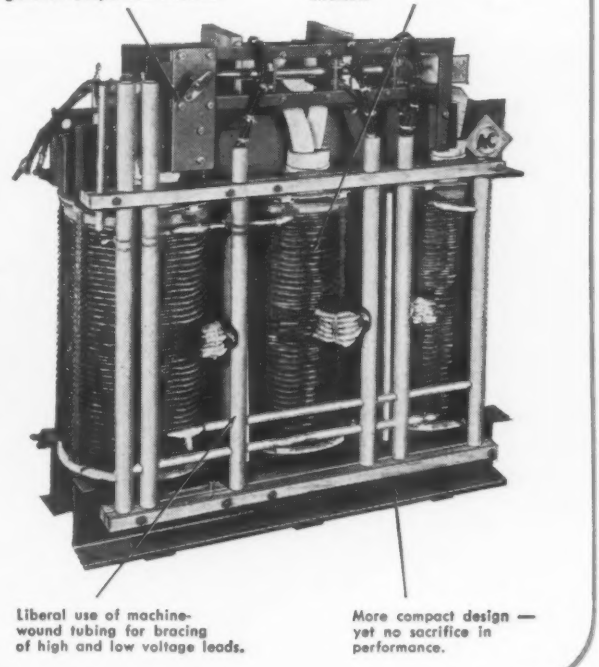
If you are not fully acquainted with the economies, the space-saving features and the relative simplicity of installation of Oilostatic cable system for either power transmission or station circuits, you should immediately call in your Okonite representative. In any case, let us send you full details. Just write on your company letterhead for the Oilostatic File Folder, addressing The Okonite Company, Passaic, New Jersey.

* Trademark Registered

OILOSTATIC TRANSMISSION SYSTEMS

These Improved Allis-Chalmers Network Transformers Meet Any Network System Specifications!


Your Choice: Welded-on or bolted-on cover. Easy access to all accessories!
Low Voltage Throat — fits the protector of your choice!
Disconnect and Ground Switch—capable of breaking magnetizing current — electrical interlock prevents operation under load!


Special-design tap changer assembly with self-aligning generous proportion contacts.
Rugged circular coil construction withstands heavy short circuit stresses.
Liberal use of machine-wound tubing for bracing of high and low voltage leads.
More compact design — yet no sacrifice in performance.

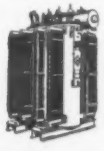
Mechanically "Dependability and long life" are *more* than words in describing *modern* network transformers that have to operate *continuously and without attention* in underground locations! That's why Allis-Chalmers has designed its *improved* transformers with *heavy* copper-bearing, corrosion-resistant steel tanks and *extra*-heavy tops and bottoms . . . with *double-checked* leak-proof welded joints . . . with *shot-blasted*, then *3-coat baked-on* "iron-like" finish! *Smaller in overall size—yet with no reduction in rugged electrical design — they meet any system specifications!*

Electrically Because of heavy short circuit duty requirement of network transformers, core and coils must be designed to withstand high stresses. Allis-Chalmers' *time-proven* circular design — using *outside* core clamping bolts and highly efficient turn-to-turn insulation — permits high thermal capacity, even under the most severe load conditions.

Yes, mechanically *or* electrically these *improved* network transformers add up to a more compact, low-loss, long life design for your network system! Tell us *your* specifications. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2295

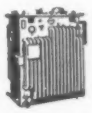
TRANSFORMERS ALLIS-CHALMERS BUILDS:



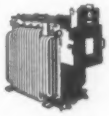
POWER — 500 kva to largest. Dry-type or liquid-filled.

5/8% STEP REGULATORS — single phase 2.4 to 15 kv; 3-phase 2.4 to 69 kv.

DISTRIBUTION — 1½ to 500 kva. Pole, vault, subway, substation and dry-types.



LOAD CENTER—100 to 2000 kva. Dry or liquid-filled. Indoor or outdoor.



NETWORK—150 to 1000 kva. Vault or subway types.

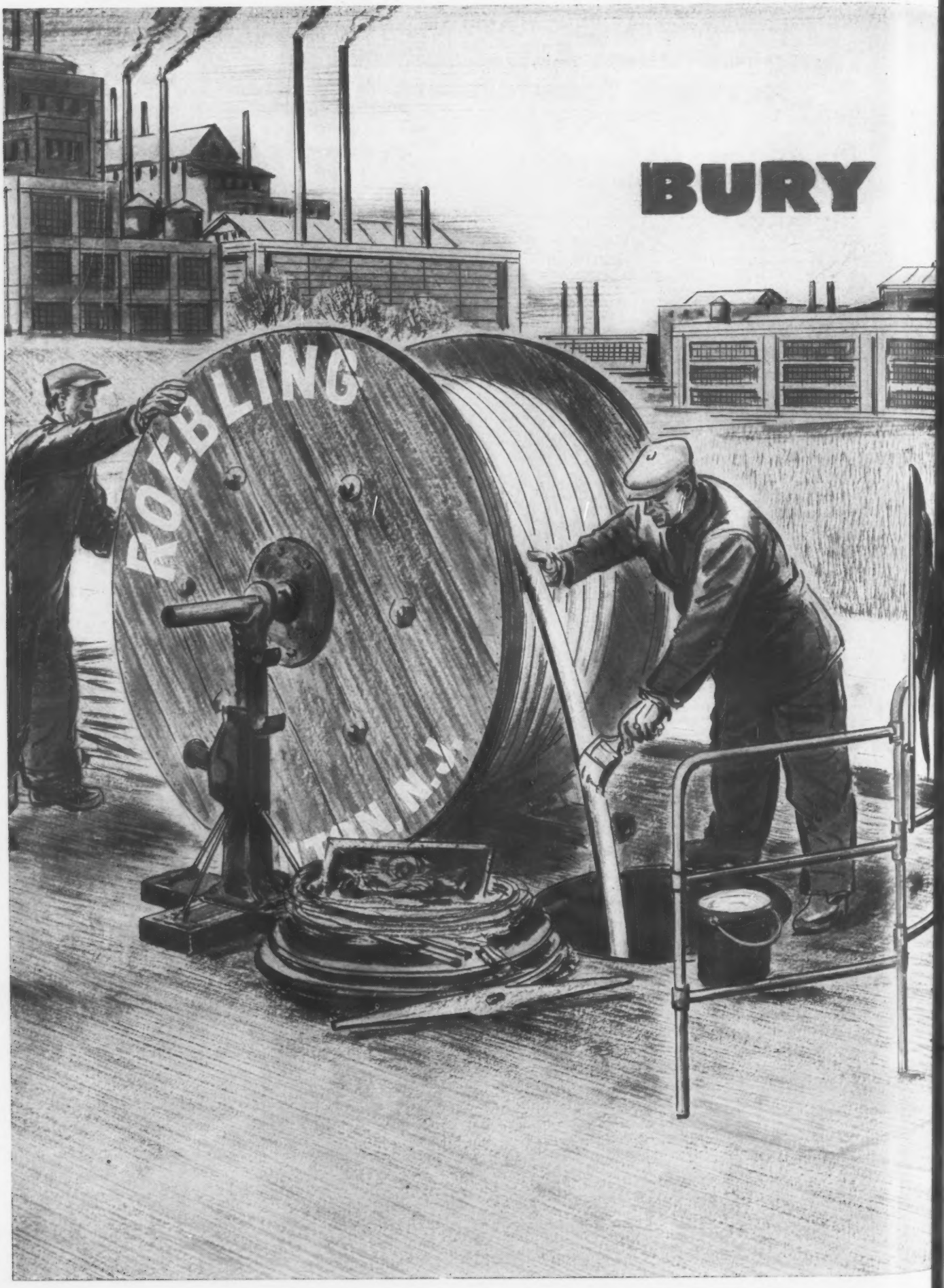
FURNACE — Indoor or outdoor. Water or self-cooled. All ratings.

INSTRUMENT — potential, current, and signal, indoor and outdoor types; outdoor metering. Standard voltages.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great


BURY
ROEBLING

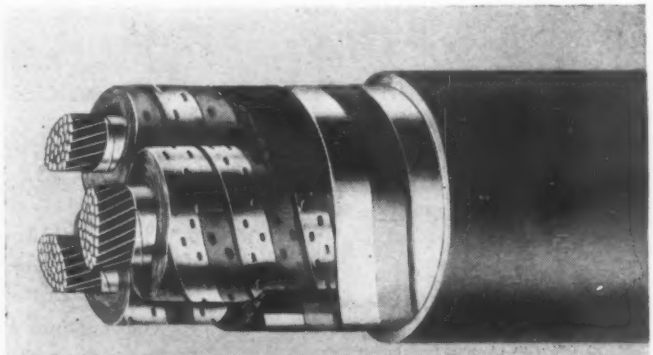
YOUR TROUBLES

GET RID OF OVERHEAD LINES and you get rid of exposure to storms and weather, costly maintenance and unsightliness. With Roebling Paper Insulated Lead Encased Cables your transmission, distribution and service circuits go underground . . . give you dependable, uninterrupted service at lowest obtainable cost.

Roebling Shielded Type H is being widely adopted for 3-phase grounded neutral circuits from 13 to 33 kv. This solid type cable is available both single and multiple conductor construction, in regular and Compack strand (round or sector). Conductors, shielded with metallized paper, are then individually insulated, protected with a perforated copper shielding tape, and the whole assembly served with a bronze binder tape. The finest materials plus Roebling engineering and production techniques give Shielded Type H characteristics of high importance in the utility field.

For a standard power cable or one manufactured for individual requirements, specify Roebling . . . your assurance of dependability and long-term low cost. A Roebling Field Man will be glad to help you select the *right* cable for specific service. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA
San Francisco • Los Angeles • Seattle • Portland



SHIELDED TYPE H

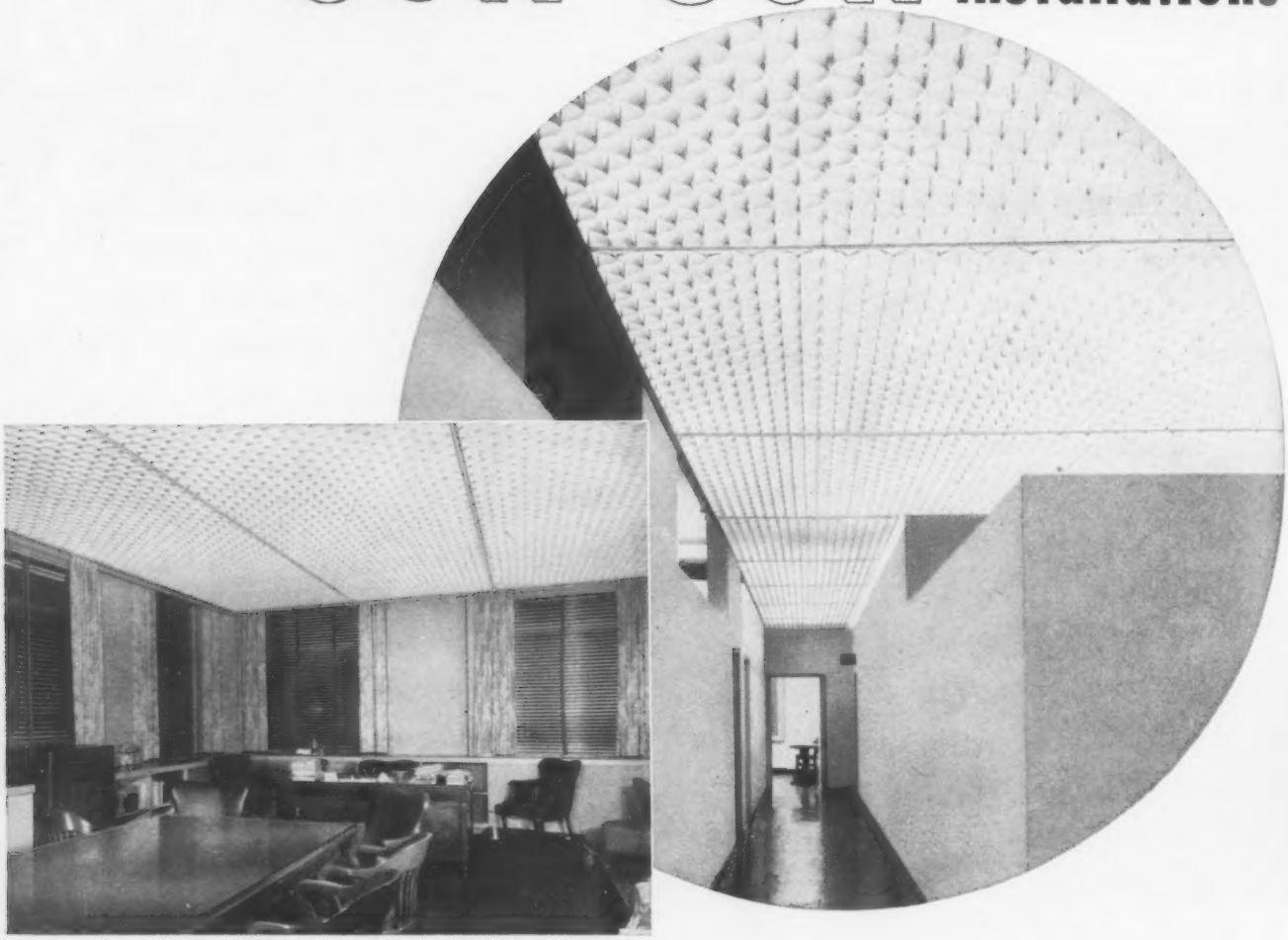
★ *WIRE ROPE AND STRAND* ★ *FITTINGS* ★ *SLINGS* ★ *SUSPENSION BRIDGES AND CABLES* ★ *AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS* ★ *AERIAL WIRE ROPE SYSTEMS* ★ *ELECTRICAL WIRE AND CABLE* ★ *SKI LIFTS* ★ *HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL* ★ *SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH* ★ *LAWN MOWERS*

ROEBLING

A CENTURY OF CONFIDENCE

JAR ROEBLING

Lighting sales *GOING UP* with FEDERAL Cell-Ceil* Installations



Foyers, display rooms and offices are taking on new life and glowing beauty with the application of Federal Cell-Ceil, the most modern lighting treatment. And, these installations are pushing lighting sales higher every day.

This beautiful overall ceiling louvering is easy to install. The light-weight sturdy hanging mechanism developed for Cell-Ceil not only speeds up application but provides such easy access for relamping and cleaning that continued customer satisfaction is assured.

Your customers are being told about Federal Cell-Ceil through full page advertisments every month in Architectural Forum, Architectural Record, Progressive Architecture and Interiors.

Increase your lighting sales—be ready to deliver Federal Cell-Ceil now! The Federal engineering staff will gladly advise on any installation problem. Our technical bulletin on installation techniques is also available, address Dept. CC-4.

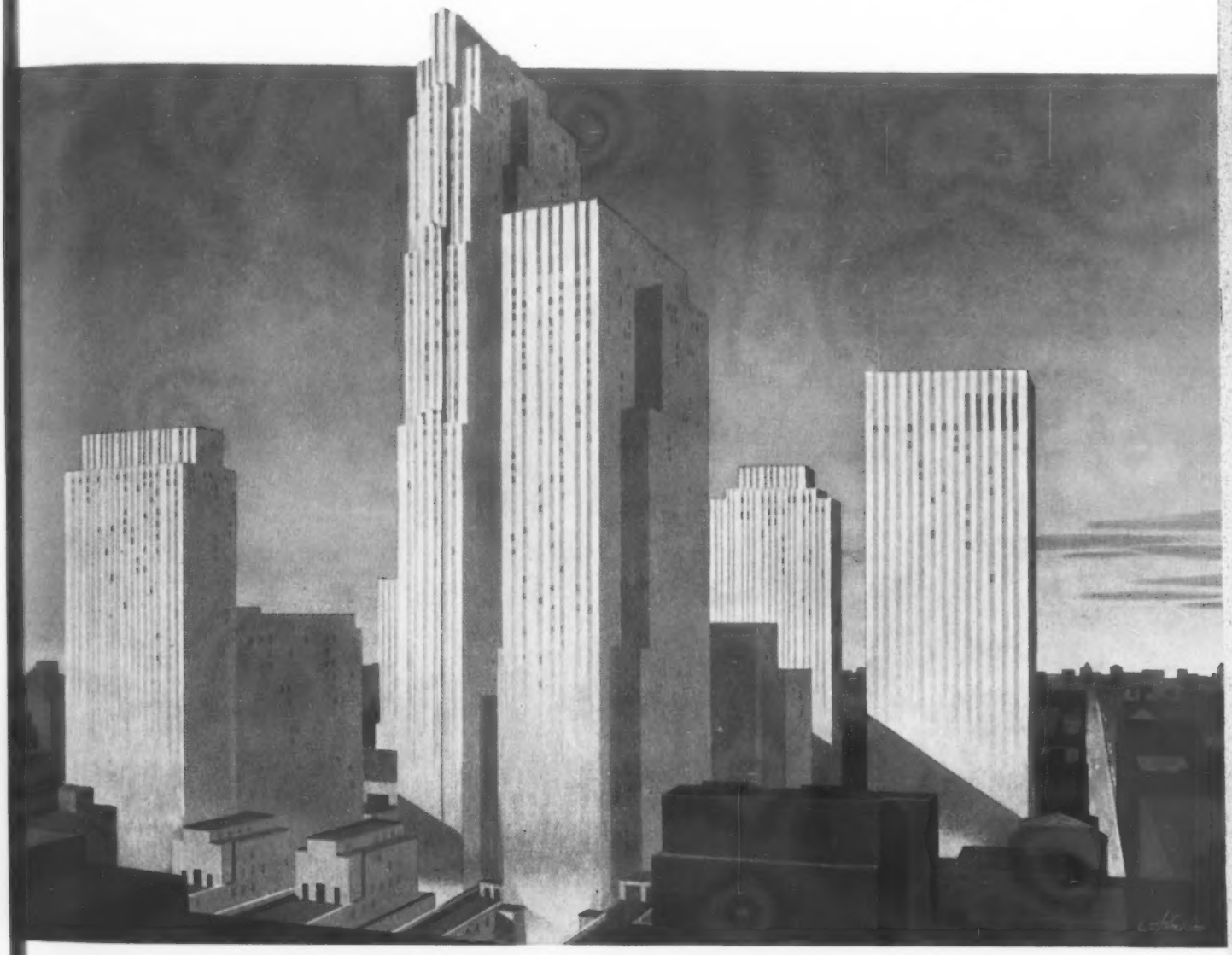
*Trade Mark "Cell-Ceil" applied for.

FEDERAL ENTERPRISES, INC.

Formerly: FEDERAL ELECTRIC COMPANY, INC.

8700 S. STATE STREET • CHICAGO 19, ILLINOIS

YOU CAN BE SURE..IF IT'S Westinghouse



HERE ARE 190,000 DEMONSTRATIONS A DAY

Half these demonstrations are "going up". The other half are "going down".

Elevators, we mean . . . automatic ones in Rockefeller Center, to be exact. Vertical transportation 70 stories high; 175 de luxe Westinghouse passenger cars making a daily combined "run" as far as from New York to Salt Lake City.

You have to be *sure*, in planning to move a city's population every day, as fast as 1400 feet a minute—up and down—and safely.

That's why each one of the 190,000 people who ride these elevators 600,000 miles a year is such a convincing demonstration of our headline. Riding a Westinghouse elevator is a downright soothing experience. There's never a jar, as the car seeks its floor levels automatically.

One just overlooks how very good engineering, and design, and construction can be. But we like it that way. We've made it our business for people to be sure, if it's Westinghouse.

MAKER OF THE BROADEST LINE OF ELECTRICAL EQUIPMENT

Ratings: 5 to 50 amperes—15,000 volts; interrupting capacity 150-1200 amperes; single-pole; single-throw; outdoor.

the new GR RECLOSER works 2 WAYS to cut your distribution costs

ONLY THE GR RECLOSER GIVES YOU ALL OF THESE FEATURES . . .

Choice of all time-delay trips or 2 fast and 2 time-delay trips (rapid change-over in the field).

Dead tank construction—no live parts exposed.

Time-delay tripping on closing after lockout—will always pick up the line.

Direct-drive mechanical integration—no pumps—no latches—no clockwork.

High-speed, 12-cycle reclosing after the first fast opening.

Self-protected—no coil burnouts from overload or lightning.

TO PROMOTE THESE ADVANTAGES!

- Eliminate costly service trips on transient faults.
- Improve service on suburban rural lines.
- Build customer good will.
- Build load through better service.
- Avoid revenue loss on unnecessarily dead lines.

A CHOICE OF 2 TRIPPING FUNCTIONS INSURES BETTER PROTECTION . . . FEWER OUTAGES ON RURAL LINES!

Here is something new . . . something different in a modern protective device for rural distribution lines. It's the *new* Westinghouse GR Recloser . . . designed to boost your revenue on extensive rural lines where faults are common and service costly.

In the GR Recloser you get a choice between (1) four time-lag tripping operations or (2) two instantaneous, followed by two time-lag tripping operations. Use the time-lag tripping setting for reclosers on the main line—two instantaneous and two time-lag on branches or line extensions. Thus, you can establish better co-ordination between reclosers—and between reclosers and fuses—than heretofore possible. The result is a minimum of system miles affected by any fault . . . a minimum of outage time on all parts of the system.

The GR Recloser is available now! So check and compare the partial list of other GR features in the panel at the left. Then ask your local Westinghouse office or distributor for full details or write for booklet B-3906. Westinghouse Electric Corporation., P. O. Box 868, Pittsburgh 30, Pa.

J-60651

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

GR RECLOSERS

Made in the WEST . . . for the WEST

These Transite Ducts safeguard Cos Cob's Power Lines

Transite* Ducts were chosen for the important job of protecting the power lines in the New Haven's Central Power Station at Cos Cob because they meet every requirement of a low-cost efficient cableway system.

These asbestos-cement ducts provide 5 major advantages:

1. Easy to Install—Transite Ducts are light in weight and come in long 10-foot lengths that are easy and economical to assemble and install.
2. Strong, Corrosion-Resistant—Transite is made of asbestos and cement combined under great pressure into a permanently strong structure. These ducts are practically unaffected by corrosive soils.
3. Immune to Electrolysis—Entirely inorganic and non-metallic, Transite Ducts are immune to electrolytic or galvanic action.
4. Permanently Smooth Bore—Long cable pulls and replacements are easy with Transite Ducts. Their smooth bore minimizes damage to cables.
5. Incombustible—Transite Ducts confine burnouts, protect adjacent cables in case of fire.

Reg. U. S. Pat. Off.

For further information on how Transite Ducts can increase the safety and cut the costs of cableway systems, write Johns-Manville, Box 290, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville **TRANSITE DUCTS**

Capacitors?

"We could not have gained system capacity as quickly and at as low a cost in any other way"

PACIFIC GAS AND ELECTRIC COMPANY

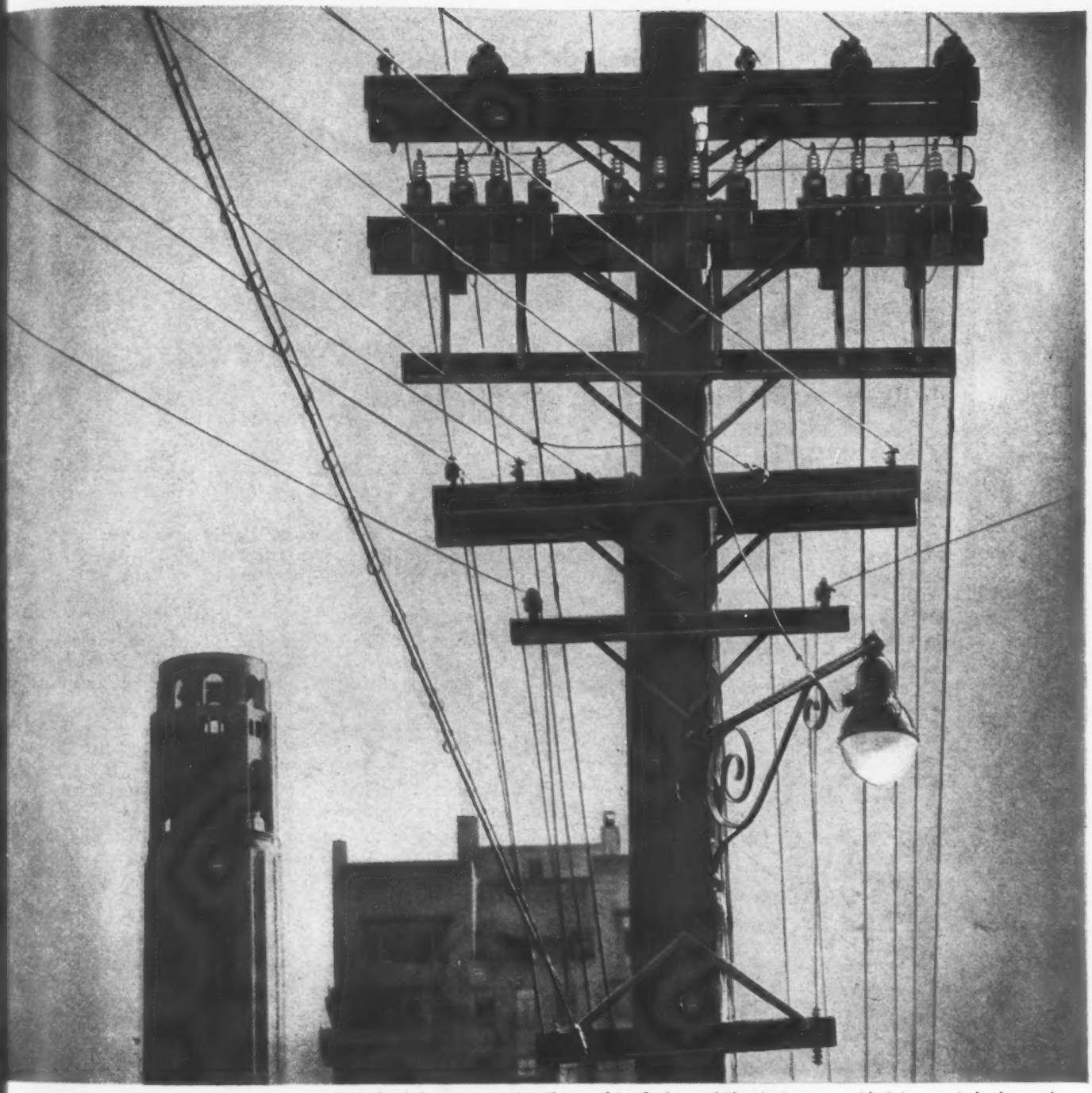
This is the story that Pacific Gas & Electric Company tells about capacitors:

"The tremendous growth of industry, and the increase of population in the California area served by our system in the last few years, has made it necessary for us to install capacitors on our system equal to approximately 20% of our system peak load.

"Capacitors, while more than justified by economic reasons have aided us materially in carrying our load during this interval of rapid growth. We could not have gained system capacity as quickly and at as low a cost in any other way.

"Like other utilities we found that the expected drop in load at the end of a shooting war did not occur and we were, therefore, faced with the problem of immediately enlarging our system capacity. Major substation increases required long and careful planning plus long intervals of time to procure necessary equipment. Constant review of load in our three operational areas showed that our transmission and distribution system was being overloaded with low power factor loads.

"Obviously, with capacitors readily available from American manufacturers at a cost of less than $10 per KVAR installed, we availed ourselves of the opportunity to correct system power factor as a whole and thus relieve system overloads and release capacity for



Typical pole-line capacitor installation of Pacific Gas and Electric Company, with Coit tower in background

rapidly increasing loads.

"This has been a wise program and almost continuous surveys in our three operating areas have been maintained since the end of the war. As a result of these surveys we have installed on our system approximately 20% of system peak load in capacitors.

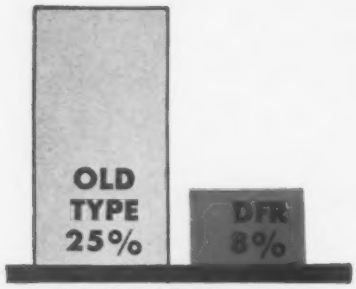
"Capacitors have made our system operation more efficient and less costly through the elimination of wattless energy and have helped correct for voltage drop, thus giving our customers better service. We believe the investment in added system capacity through the use of capacitors has been well justified and will be a continuing program."

The purpose of these advertisements is to encourage electrical utilities to exchange information on the use of power-factor-improvement capacitors. We believe that such an exchange will best bring out that capacitors can be used much more widely than at present—that they provide the fastest way of increasing peak-load capacity—that they can bring many utilities extraordinary returns by increasing capacity of existing distribution lines, transmission lines, transformers and circuit breakers—and that they offer one of the best possibilities of scaling down system costs per kilowatt. If your experience with capacitors would be of interest and value to other companies, we would like to hear from you. Contact your G-E Representative or write *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

407-11

Boost Line Capacity...



% Excitation Requirements Based on Regulator KVA

Cut Regulator Kilovar Requirements 2/3 With DFR*—The Only Single Phase Step Regulator

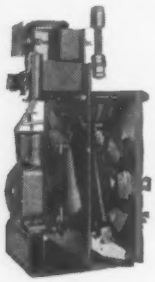
IT WAS ALWAYS GOOD economics to cut reactive kva. *Now* it's a necessity! Loads on utility systems are steadily going up. New equipment is still hard to get. So — why add to your already overburdened lines with more kilovars, when every last watt is needed? Release system capacity for pay loads!

It will pay you to use modern DFR regulators because they require only 8% excitation, compared with 25% required by old type single-phase regulators. You'll be amazed to find how much the high exciting current required by old type regulators is costing you. Figure these costs on the basis of $10 per installed kva for capacitors needed to balance high exciting current.

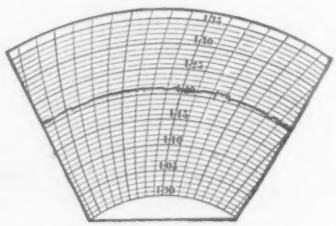
The modern Allis-Chalmers DFR regulator with its thirty-two 5/8% steps holds ± 1 volt band widths — provides the same close, reliable control successfully used to regulate over 5 million kva.

For further information on this modern economical control, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2339



A RUGGED, self centering, shock absorbing, quick-break mechanism is employed in the DFR regulator. Mechanism is immersed in oil — self lubricated — dirt free.



HOLDS ± 1 VOLT BAND. The DFR is unhindered by the limitations of conventional voltage relays or motor brakes to prevent overshooting or hunting.

*DFR — the only station type step regulator you can buy for single phase duty. Sizes to 6900 v, 250 kva. For 3 phase regulation there is the AFR.

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

TO REDUCE YOUR POLE LINE OUTAGES IN ALL WEATHERS

UNAFFECTED BY MOISTURE

WITHSTANDS SUN RAYS

UNAFFECTED BY TROPICAL HEAT

PLIABLE AT BELOW ZERO

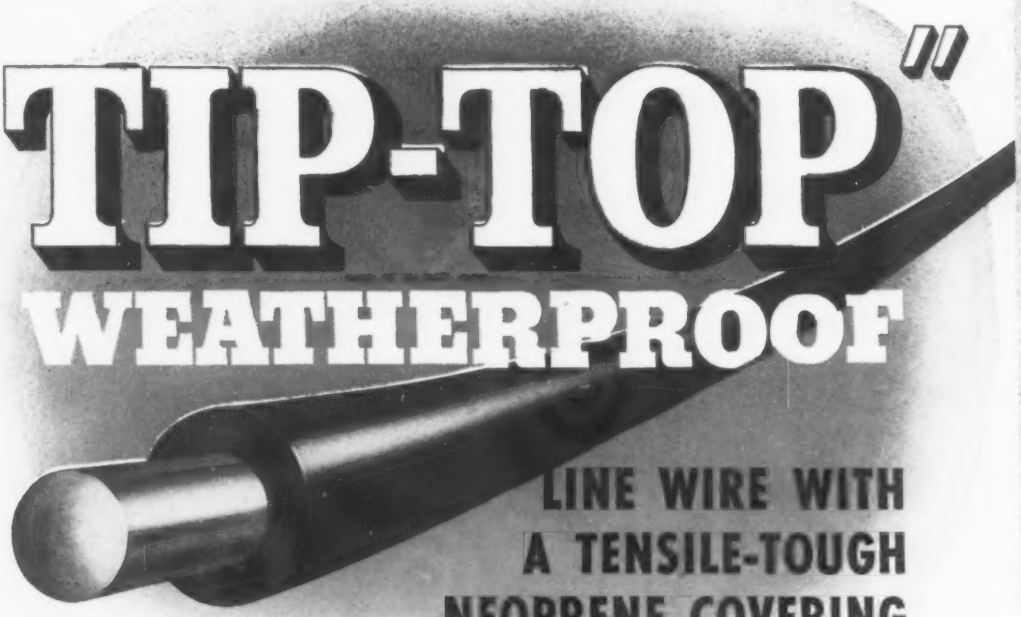
ABRASION RESISTANT

SEAMLESS, SMOOTH

NO UNSIGHTLY FESTOONING

EASY TO HANDLE

"TIP-TOP" WEATHERPROOF



LINE WIRE WITH A TENSILE-TOUGH NEOPRENE COVERING

An original General Cable Compound development!
Copper Conductors—Hard, Medium-hard or Soft Drawn

The Neoprene-Plus compound has been painstakingly developed by General Cable Research to embody service characteristics of exceptional merit.

Longevity tests of over 10 years continuous exposure to outdoor industrial atmosphere have indicated no evidence of deterioration.

Engineers and Research staff will be glad to supply you with full test data in detail, and to quote from the experience of many users. Write or phone.

GENERAL CABLE GENERAL CABLE GENERAL CABLE

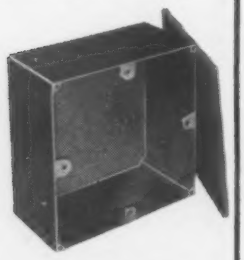
GENERAL CABLE
CORPORATION

Headquarters at 420 Lexington Avenue, New York 17, N. Y. General Cable Corporation Sales offices are located at: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, Rome (N.Y.), St. Louis, San Francisco, Seattle, Washington (D. C.)

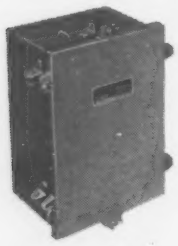
MANUFACTURERS OF BARE AND INSULATED WIRES AND CABLES FOR EVERY ELECTRICAL PURPOSE

O.Z. cast iron boxes

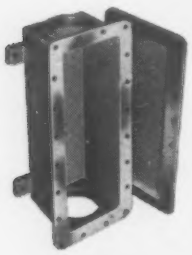
COMPLETE LINE • COMPLETE LINE • COMPLETE LINE COMPLETE LINE



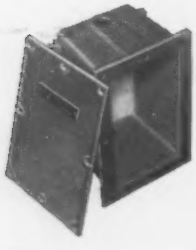
TYPE YI200
Unflanged junction box with cover. Flush or Surface mounting.



TYPE Y3200
Weatherproof pull box. Complete with one-piece rubber gasket and hinged cover; surface mounting.



TYPE Y6000
Explosive resisting junction box designed in accordance with Underwriter's Laboratory requirements. Cover and flange are accurately machined and correct bolt spacing provided. Flush or Surface mounting.



TYPE Y8000
Flanged watertight box with cover complete with rubber gasket. Flush or Surface mounting.

5214

When you specify O. Z. Cast Iron Boxes for industrial, railroad, airport, oil refinery and other heavy-load circuits, you specify the best. Cast from close-grained, grey iron, these sturdily constructed boxes are accurately machined to your requirements and then hot-dip galvanized to provide maximum corrosion resistance.

No matter what the operating condition . . . explosion resisting, watertight or weatherproof . . . you'll find a box to fit the job in O. Z.'s complete line. All boxes can be supplied with or without bosses or mounting lugs and are drilled for conduit entrances as required.

For detailed information on O. Z.'s Cast Iron Boxes as well as 150 other electrical fittings, write for our catalog.

- CAST IRON BOXES
- SOLDERLESS CONNECTORS
- CONDUIT FITTINGS
- CABLE TERMINATORS
- GROUNDING DEVICES
- POWER CONNECTORS

Buy O.Z. and you'll see why Engineers say,

"They're OK If They're O.Z."

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.

262 BOND STREET · BROOKLYN 2, N. Y.

New Beauty Treatment for Commercial Interiors!

LEADERALL

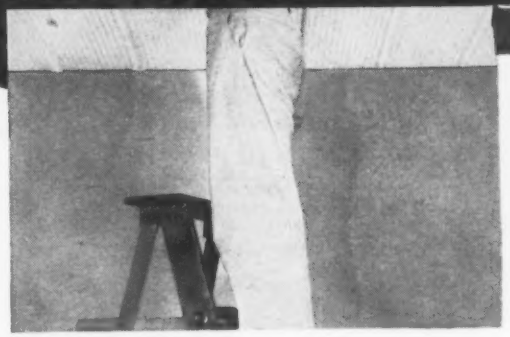
Illumination over all ...from wall to wall!

NEW FOR OLD!

A CEILING OF LIGHT ...AT ANY HEIGHT!

The new look for high-ceilinged rooms . . . A magic means of bringing high ceilings down to modern levels . . . and an economical means of "decorating" them, permanently, in the modern manner. (Leader tie-rods are adjustable and also are available in extreme lengths for long "drops.")

Completely LEVEL · Absolutely RIGID
NO OTHER OVERALL-TYPE FIXTURE CAN MAKE THIS CLAIM



Only LEADERALL brings you all these valuable features:

Reduces the cost of finishing new ceilings . . . Featherweight unit-frames . . . Transclucent moulded Vinylite (fire-resistant) louvers permit many more apertures per foot for maximum "sifting" of lamp rays and greatest shielding of lamps (45° visual cut-off) . . . Insures highest quality of light for greater beauty and greater durability . . . Lightweight construction eliminates structural strains . . . Destaticized plastic louvers—dust-resistant, stay-white* Vinylite . . . Adjustable tie-rods . . . Units instantly removable for cleaning or for quick re-lamping . . . Complete rigidity—moulded units withstand rough handling by maintenance men.

**Furnished, on special request, in colorfast hues for color schemes.*

Light LIGHT... all in *white!

The lightest weight over-all type fixture on the market, thanks to LEADER'S exclusive, one-piece *moulded translucent plastic louvers*. They are inflexible. Absolute uniformity, and more louvers per foot, achieving greater shielding of lamps, plus better diffusion of light, and no weight stress or strain on ceiling structure!

Leaderall LOUVERED LIGHT CEILING

A revolutionary application of fluorescent lighting—light by the square yard. An overall speedway of man-made sunbeams that speeds up worker efficiency. Calm, cool brilliance uninterrupted . . . A cheerful, May-morning sky throughout the year. Super-rich beauty, plus a new high in abundant light that's kind to eyes.

Send for mechanical details—today!

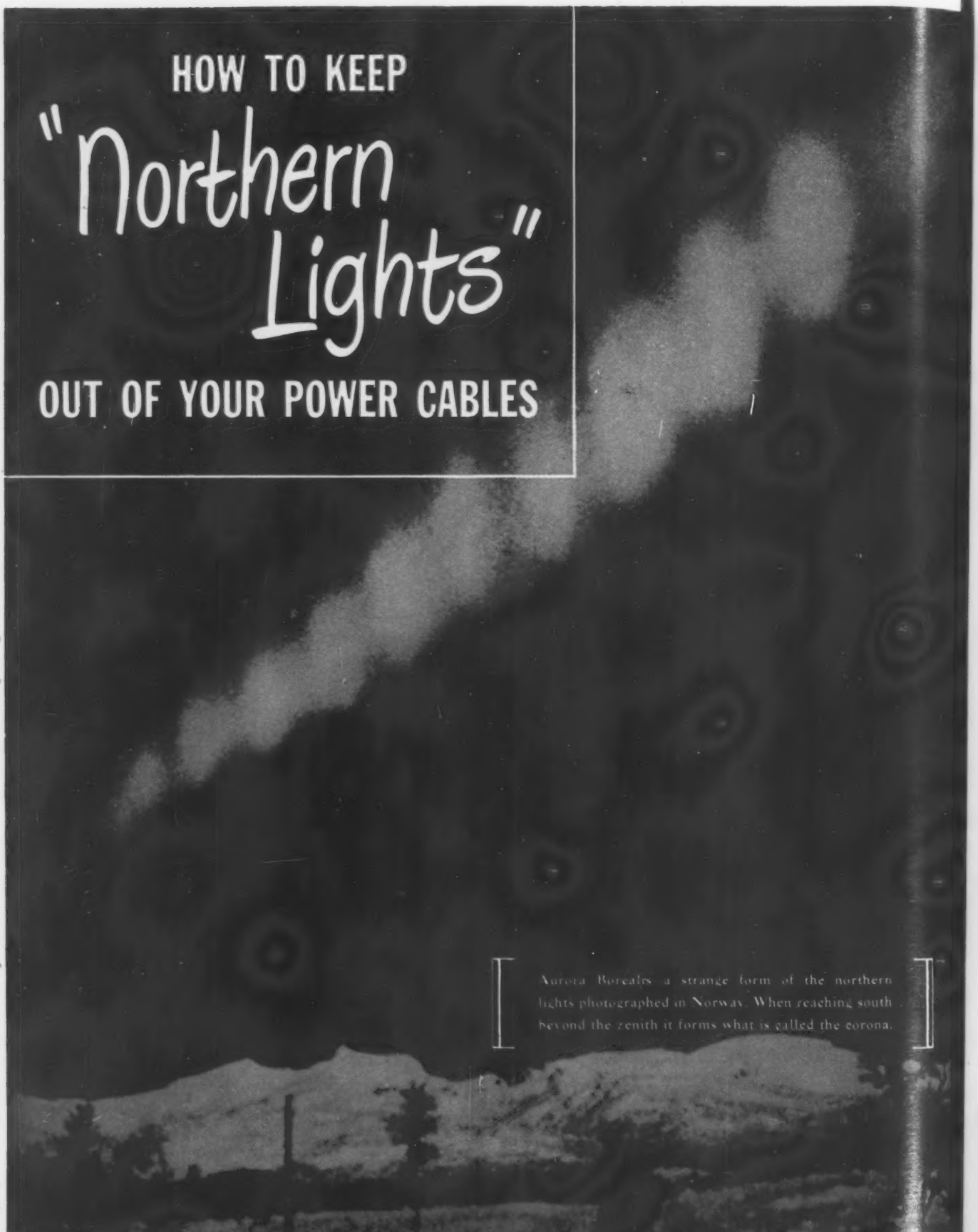
Leader Fluorescent Fixtures are sold and installed only by the better wholesalers and contractors.

LEADER ELECTRIC COMPANY

3500 N. KEDZIE AVENUE, CHICAGO 18, ILLINOIS

West Coast Factory: 2040 Livingston, Oakland 6, California

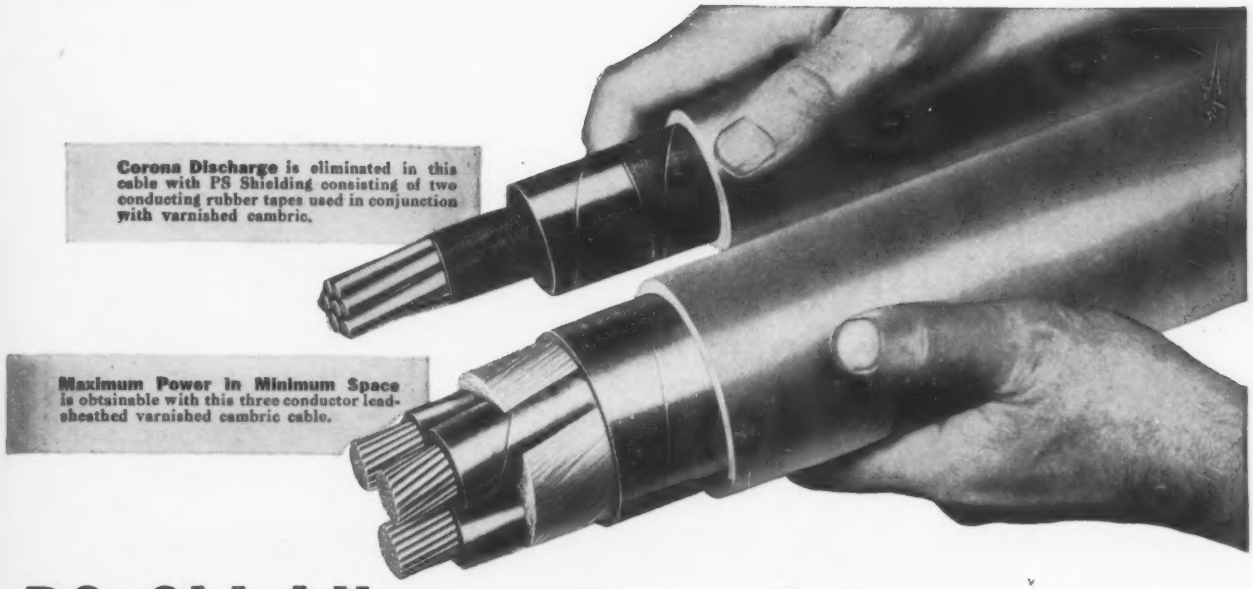
HOW TO KEEP "Northern Lights" OUT OF YOUR POWER CABLES



Aurora Borealis—a strange form of the northern lights photographed in Norway. When reaching south beyond the zenith it forms what is called the corona.

Types of Varnished Cambric Cables

- Single-conductor series street lighting cables.
- Multiple-conductor non-leaded and unarmored cables.
- Control cables with combination of different colored braids.
- Single-conductor lead-sheathed cables.
- Single-conductor non-leaded cables.
- Multiple-conductor lead-sheathed or metallic-armored cables.


Corona Discharge is eliminated in this cable with PS Shielding consisting of two conducting rubber tapes used in conjunction with varnished cambric.
Maximum Power in Minimum Space is obtainable with this three conductor lead-sheathed varnished cambric cable.

PS Shielding puts a stop to Corona discharge

CORONA discharge of power cables is small in comparison to that of the Aurora Borealis or northern lights but can be extremely troublesome. Any little air gap in a power cable is a potential source of damage from corona discharges. When a metal-shielded cable is bent and later straightened, or when it expands and contracts with alternate heating and cooling in service, the metal shield tends to separate slightly from the insulation forming air gaps. The voltage of the conductor causes a spark discharge across the gap with attendant corona and ozone formation.

With type PS Shielding, this condition does not occur. The flexible conducting tape is always in intimate contact with the insulation, thus preventing formation of air gaps and eliminating corona discharges.

In cables for operation at the higher voltages, "conductor shielding"—added to the shielding over the insulation—provides a further improvement in operating characteristics. This consists of a conducting tape applied directly over the copper conductor, as pictured above.

The improved U·S·S American Varnished Cambric Cables with PS Shielding offer maximum freedom from faults . . . for they not only eliminate corona troubles but also have higher resistance to heat. They can be operated at 85° C—notably higher than rubber . . . and in the lower range of working voltages (5,000 or less), they may be safely operated at the same maximum temperatures usually recommended for paper insulation.

Write for the latest information on U·S·S American Varnished Cambric Cables.

WHERE TO USE U·S·S AMERICAN VARNISHED CAMBRIC CABLES

IN MODERATE OR LOW-VOLTAGE INSTALLATIONS where its superior heat resistance permits greater current carrying capacity for a given copper area.

• • •

IN POWER PLANTS for general wiring and such applications as insulated bus bars, motor and generator leads, connections for oil switches, transformers and voltage regulators.

• • •

IN INDUSTRIAL PLANTS, especially where heavy loads must be transmitted for short distances.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

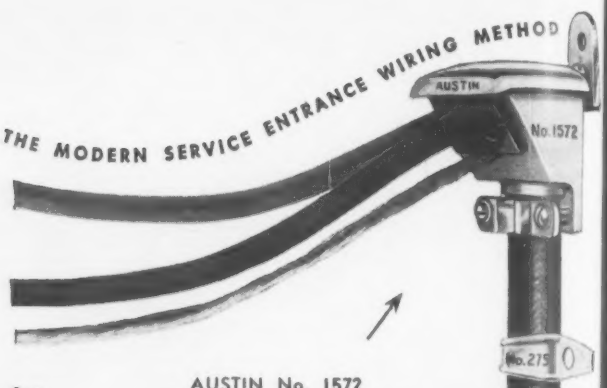
AMERICAN STEEL & WIRE COMPANY
USS
AMERICAN ELECTRICAL WIRE AND CABLE
UNITED STATES STEEL

U·S·S American Varnished Cambric Cables

AUSTIN

ENTRANCE CAPS AND FITTINGS *for Service Entrance Cable and Rigid Conduit*

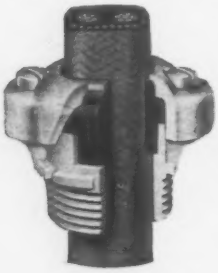
For modern Service Entrance wiring you can't beat the complete AUSTIN line of caps, cables and fittings.



AUSTIN No. 1572
Entrance Head—Furnished with a one-hole mounting bracket for quick and easy attachment to building. Cable is held into the head by an internal clamp. Made of rustless aluminum.

FITTINGS FOR SERVICE ENTRANCE CABLE

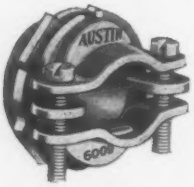
The AUSTIN Line includes a wide variety of connectors to fit all the various sizes of cable



AUSTIN No. GR-1
Grounding Ring—For bonding meter box to artificial ground. Tight connection and positive bond, without soldering.

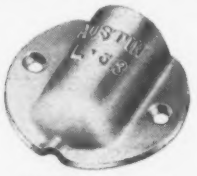
AUSTIN No. SO-36
Watertight Connector — Cutaway view shows how 3-point compression forces rubber gland around entire circumference of cable.

AUSTIN No. O-36
Hex Nut Watertight Connector—Special rubber bushing tightly grips cable when cap is screwed down.



AUSTIN No. 6009
Non - Watertight Connector—Takes a wide range of sizes and types of cable, round or oval, without the use of shims or inserts.

AUSTIN No. 275
Oval, One Hole Strap—Rustless aluminum one hole strap for oval shaped cable.



AUSTIN No. L-63
Sill Plate—Provides metallic protection to service entrance cable at the most hazardous point where it enters the building. Makes a safer and better appearing installation.

AUSTIN No. 2275
Rustless aluminum two hole strap for oval shaped cable.

AUSTIN No. T-238
Made of rustless aluminum, for two cables. One hole.

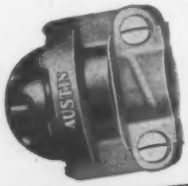
AUSTIN No. F-63
Rustless Aluminum Floor Plate.

CAPS AND SERVETS

AUSTIN No. 1660
Conduit End Servet—Convenient for all combination work because of its size. No loose parts. Three hole insulator.

AUSTIN No. 1525
Universal Service Entrance Head—Cap furnishes complete protection of the interior from exposure in either vertical or horizontal position.

AUSTIN No. 1580
Flanged Type Entrance Head—Combination Entrance Cap and Flange especially recommended for out-building service entrances in accordance with REA specifications. Licensed under U. S. Pat. No. 2234640. Rustless aluminum.



AUSTIN No. 1650
Cable End Servet — For use with armored cable or non-metallic sheathed cable. Three hole insulator.

The M. B. Austin Company
NORTHBROOK, ILLINOIS

Sold Only Through Electrical Wholesalers

SAY "RoFlex" AND SAVE

Yes, you will save both time and installation costs by asking for . . . and insisting upon . . . this new superior Rome non-metallic sheathed cable. It is "easy to work" and is a quality product, manufactured for safe and trouble-free electrical circuits.

These RoFlex features assure you of the utmost in workability and dependable quality:

STRIPS EASILY

1. The thermoplastic insulated conductors *strip easily,* leaving bright, clean copper for quick connection. The insulation is highly resistant to oils, acids, moisture and flame . . . is permanently colored for quick and easy circuit identification

DURABLE PROTECTION

2. A spiral wrap of specially treated paper covering each conductor provides light-weight, *durable protection* against mechanical injury . . . yet, strips back easily.

LONGITUDINAL STRENGTH

3. Impregnated jute fillers in each valley give the finished cable increased *longitudinal strength,* and serve as a "rip-cord" for stripping the outer braid.

FLAME AND MOISTURE RESISTANT

4. The outer cotton braid is *flame and moisture resistant.* The uniformly small diameter saves space in outlet boxes and fits smaller holes.

Underwriters' Approved for 60° C operation under the '47 National Electrical Code.

Again, we say, there are good reasons why you should insist upon RoFlex. It means to you . . . easier stripping, lighter weight, uniformly small diameters, cleaner handling, and dependable quality . . . in short, a profitable job for you and long-lasting satisfaction for your customer.

REMEMBER THE NAME ROFLEX. LOOK FOR IT ON EVERY CARTON

ADEQUATE WIRING SERVES AND SAVES

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

PACIFIC ELECTRO SALES, INC., Pacific Coast Agents

SALT LAKE CITY 1, UTAH
419 Beneficial Life Bldg.

PORTLAND 9, OREGON
1233 N. W. Twelfth Street

LOS ANGELES 21, CALIF.
2038 Bay Street

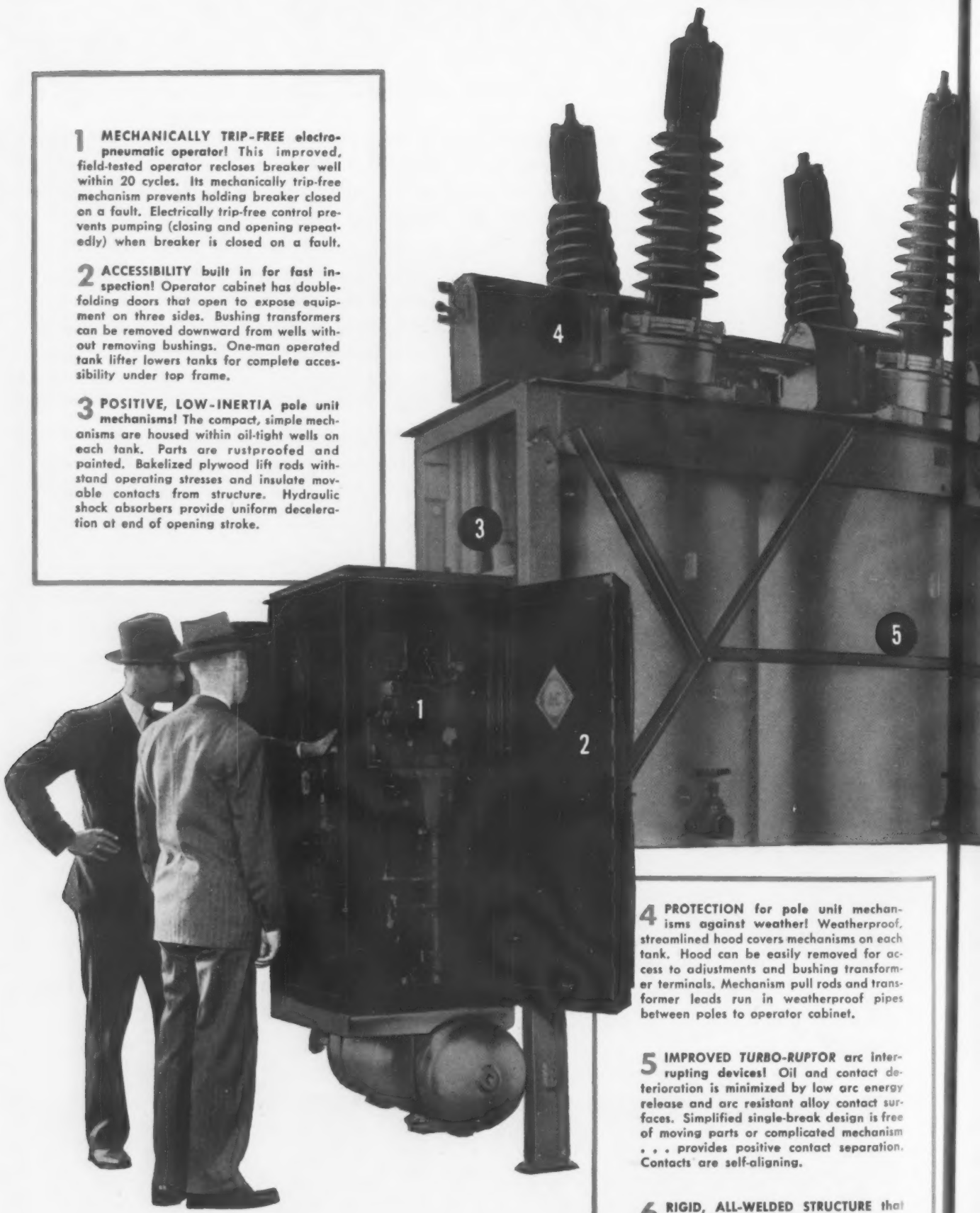
SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3401 Fourth Ave., So.

1 MECHANICALLY TRIP-FREE electro-pneumatic operator! This improved, field-tested operator recloses breaker well within 20 cycles. Its mechanically trip-free mechanism prevents holding breaker closed on a fault. Electrically trip-free control prevents pumping (closing and opening repeatedly) when breaker is closed on a fault.

2 ACCESSIBILITY built in for fast inspection! Operator cabinet has double-folding doors that open to expose equipment on three sides. Bushing transformers can be removed downward from wells without removing bushings. One-man operated tank lifter lowers tanks for complete accessibility under top frame.

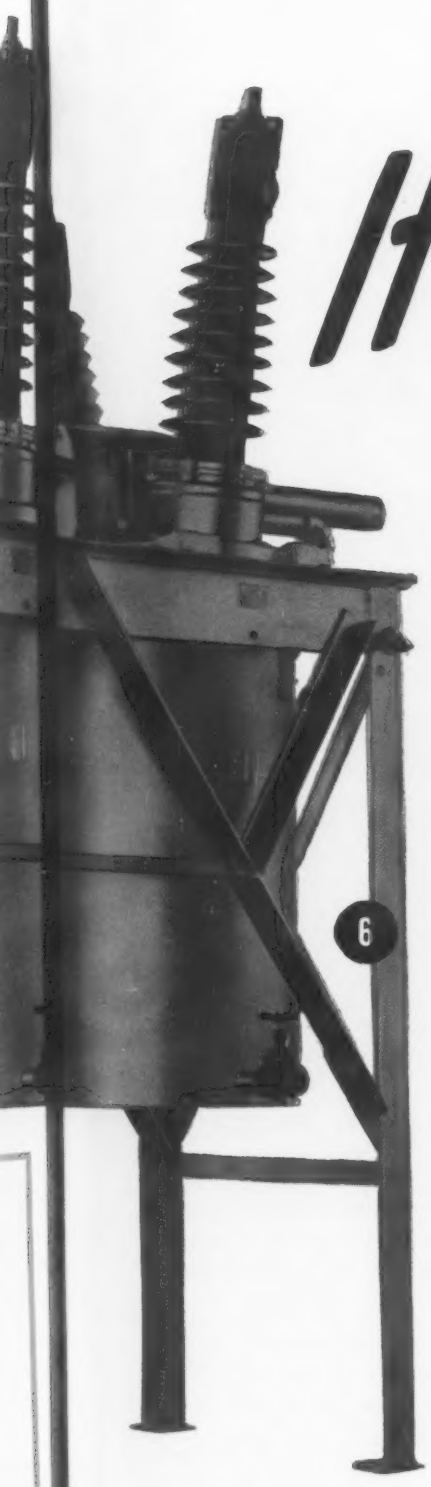
3 POSITIVE, LOW-INERTIA pole unit mechanisms! The compact, simple mechanisms are housed within oil-tight wells on each tank. Parts are rustproofed and painted. Bakelized plywood lift rods withstand operating stresses and insulate movable contacts from structure. Hydraulic shock absorbers provide uniform deceleration at end of opening stroke.



4 PROTECTION for pole unit mechanisms against weather! Weatherproof, streamlined hood covers mechanisms on each tank. Hood can be easily removed for access to adjustments and bushing transformer terminals. Mechanism pull rods and transformer leads run in weatherproof pipes between poles to operator cabinet.

5 IMPROVED *TURBO-RUPTOR* arc interrupting devices! Oil and contact deterioration is minimized by low arc energy release and arc resistant alloy contact surfaces. Simplified single-break design is free of moving parts or complicated mechanism . . . provides positive contact separation. Contacts are self-aligning.

6 RIGID, ALL-WELDED STRUCTURE that maintains adjustments! All-welded top frame supporting entire pole unit is welded to structural frame to form a rigid assembly. Exterior design eliminates corrosion-inviting crevices. Entire breaker is protected by three coats of weatherproof paint.



It's Completely Up-to-Date!

THE NEW ALLIS-CHALMERS FZO-151 OIL CIRCUIT BREAKER

RATED 69 KV: UP TO 3,500,000 KVA — WITH INTERRUPTION IN 8 OR 5 CYCLES . . . FAST RECLOSING WITHIN 20 CYCLES!

LOOK AT SIX of its many important features at left! *All* help you get modern breaker performance — help you save time and money on maintenance.

They include the *mechanically trip-free* electro-pneumatic operator . . . low-inertia pole unit mechanisms . . . and *Turbo-Ruptor* arc interrupting devices. Each is built for long, dependable service.

Talk to your nearby Allis-Chalmers representative about the FZO-151 circuit breaker . . . other Allis-Chalmers 69 kv breakers with 8- or 5-cycle interruption . . . and your other breaker needs, indoor or outdoor, in standard ASA ratings. Or write direct.

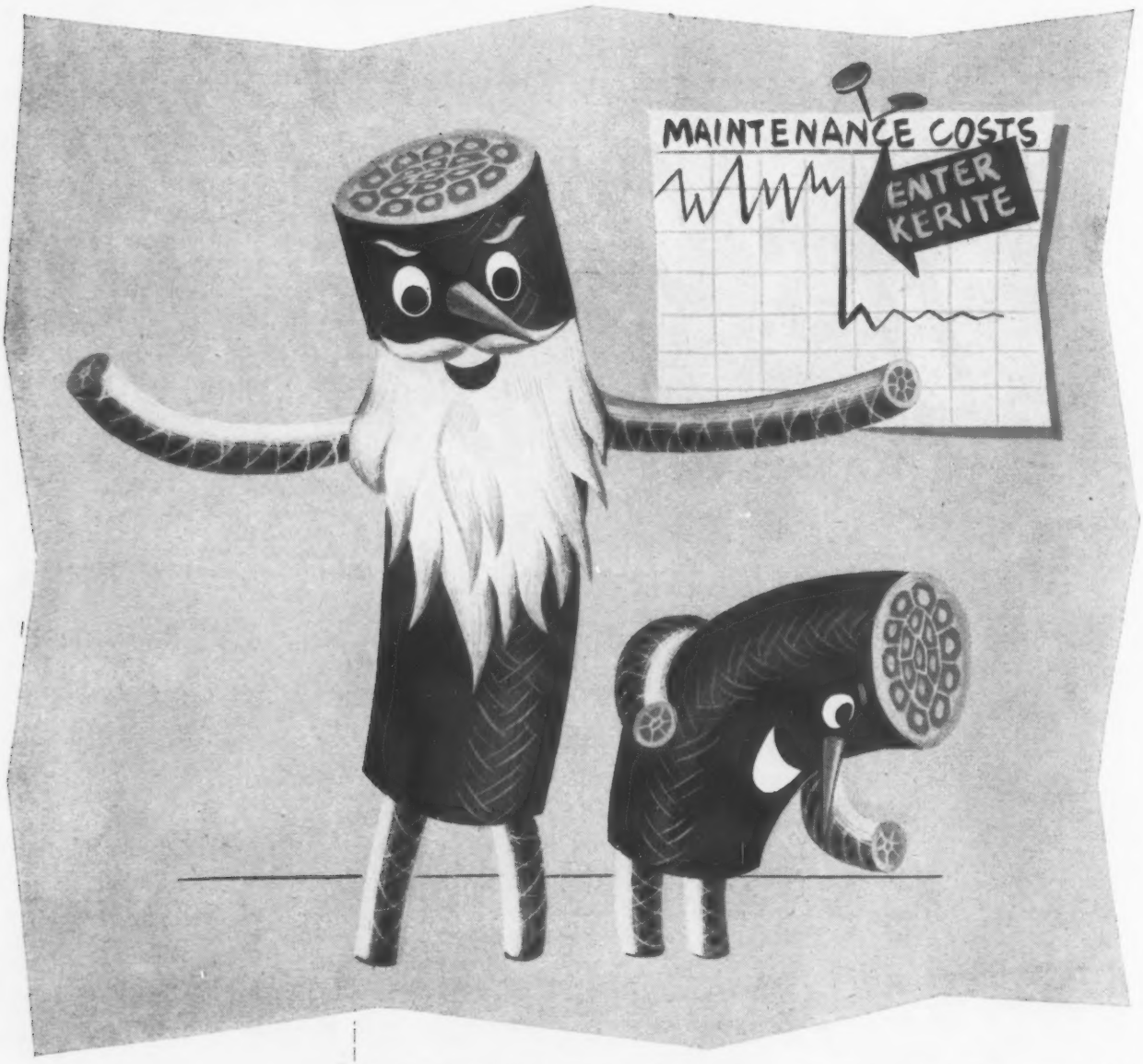
Turbo-Ruptor is an Allis-Chalmers trademark.

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

A 2561



Long life... Low cost per year

THE Kerite story—boiled down—is just that: "Long life . . . low cost per year." Cost-conscious cable buyers love it. Kerite has been proving it, too, for more than 90 years.

Kerite makes insulated wire and cable for all types of service—from low-voltage signal circuits to power circuits and high-voltage x-ray and other electronic applications . . . and for underground, overhead, and submarine installations.

Our long experience provides the answer for most any cable problem. If you have a *new* problem requiring a special solution, our engineers will be glad to work with you so that you can take full advantage of Kerite insulation.

Kerite made to the old formula is still used in our insulation. That is what makes Kerite cable such a good buy today . . . and why it gives such long service at low cost per year. The Kerite Company, 30 Church Street, New York 7, N. Y.

Kerite Insulation—Your Cable's Best Life Insurance

DAYS KERITE

KERITE CABLE

Another achievement of Shell Research—

SHELL DIALA OIL 15

a revolutionary transformer oil that gives 50-year service

We went into the problem of oil oxidation

We studied how, under heavy load conditions in transformers, both heat and oxygen could change an oil chemically . . . cause sludge, acidic deterioration products and peroxides. These are the impurities which reduce cooling efficiency . . . damage cloth insulation . . . ultimately corrode exposed copper and iron surfaces. Until our study, there wasn't much you could do about it except to spend money on oil changes and transformer overhaul, or invest in expensive oil protection devices such as conservators.

Shell Diala Oil 15 was developed to step costs down

We examined Shell Diala Oil 15 against all competitive oils on the market, comparing rates of oxygen absorption at high temperatures as well as more commonly measured properties. Even our top research men were surprised when Shell Diala Oil 15 resisted oxidation *140 times longer* than the next best transformer oil. Judging by these accelerated tests, Shell Diala Oil 15 *can last better than 50 years in even an open, air-breathing transformer.* That means money saved and then some!

And that isn't all—

Further tests proved that Shell Diala Oil 15, in addition to its remarkable oxidation resistance, possesses all other properties required of superior transformer oil . . . excellent thermal transfer, a dielectric strength above 30,000 volts . . . a very low pour point . . . minimum volatility . . . up to 37% less fabric deterioration. And it is equally effective for oil-filled switches. Ask your Shell representative where and how it can help you.

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?

Your Shell Lubrication Engineer can make a complete study and analysis of your plant and machines . . . give you engineering counsel, advice on new lubricants and their application . . . help you set up schedules and controls for each and every machine. For that kind of service — call in your Shell Lubrication Engineer.

SHELL

Now it's easy to say Goodbye to Guesswork

You get the Right truck . . . the Complete truck . . . on just One Order . . . when you use FWD's simple BUILT-TO-CODE chart to select the FWD motorized unit you need

ONE UNIT . . . one order . . . one responsibility! Yes, FWD's handy *built-to-code* chart makes your selection of line construction and maintenance trucks that simple . . . that trouble-proof. And here's why —

You quickly see the 38 varying — yet standardized — combinations that are available and the specific equipment each FWD carries.

You easily order the FWD you want because each unit is designated by an individual code number.

You issue only one order because FWD engineers and builds the *complete* unit — truck and equipment. That's why — when your FWD is delivered — it's ready to go to work immediately.

What's more — with FWD supplying the complete unit — buck-passing is eliminated. FWD accepts full responsibility.

Let FWD's code chart help simplify your equipment purchases. See Graybar or write us direct.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: KITCHENER, ONTARIO

Built-to-Code
MOTORIZED UNITS
For Line Construction and Maintenance

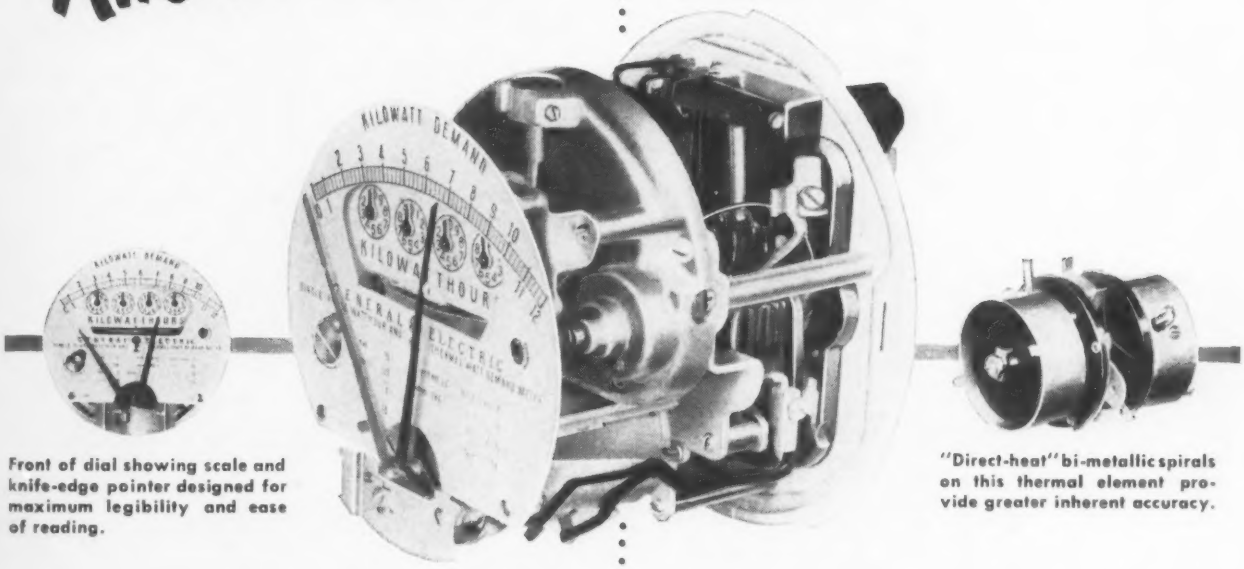
Built by

Makers of America's Foremost Heavy Duty Truck

Distributed by GraybaR

GENERAL ELECTRIC ANNOUNCES A NEW WATTHOUR THERMAL DEMAND METER WHICH ACCURATELY MEASURES BOTH---

Kilowatt hours Kilowatt demand



Front of dial showing scale and knife-edge pointer designed for maximum legibility and ease of reading.

"Direct-heat" bi-metallic spirals on this thermal element provide greater inherent accuracy.

The IHM watthour-meter element is a "wide-limit" meter—equally accurate at high and low loads. It has braking magnets die-cast in the frame, butyl-rubber-molded current coils, and polyethylene-enclosed current coils similar to those used in the new I-50 watthour meter.

A relief gap provides a controlled breakdown point and serves to direct electrical surges away from the electromagnet and terminals.

These features are all part of the integral unit-construction that assures you of greater accuracy and stability.

Bimetallic spirals make possible this thermal demand element with full-scale torque. It operates on the "direct-heat" principle and has no overshoot. The heat is developed within the bi-metallic spirals. Thus, because of the high efficiency, a greater torque is produced, and makes possible the use of larger and more sturdy parts that result in greater reliability.

Since the thermal element is independent of heat transfer, it operates in accordance with a true exponential curve, and has these advantages:

1. On transient loads the meter will not overshoot.
2. The response of the meter can be easily analyzed and predicted.
3. Shorter testing time is possible because the meter can be overloaded to attain desired indication quickly.

The IHM is essentially two meters in a single case—quite a saving in space. Yet, in base dimensions it is the same as standard watthour meters in both the socket-connected (S) and bottom-connected (A) types. It may, therefore, be installed in watthour-meter sockets that are already in place—a saving in installation costs.

To give you more facts, figures, diagrams, and pricing information on this new meter we've prepared a bulletin (GEC-408). Get a copy from your nearest G-E sales representative today. Or, write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

601-24

UNION PACIFIC

The Governor of Nevada *invites You*

STATE OF NEVADA
EXECUTIVE CHAMBER
CARSON CITY

VAIL PITTMAN
GOVERNOR

To American Industry:

With the rapid increase in population of the United States, combined with the decentralization of industry and the westward movement, Nevada is destined for great industrial expansion in the near future.

Contributing factors are:

1. Cheap hydro-electric energy
2. Raw materials, with emphasis on livestock and minerals (metallic and non-metallic)
3. Other natural resources
4. Favorable labor conditions because of friendly relationships between industry, management and labor
5. Ideal climate and exceptionally favorable working conditions
6. Nevada's tax structure:
   - No Inheritance Tax
   - No Income Tax
   - No Sales Tax
   - No Tax on Intangibles
7. Unsurpassed transportation facilities and close proximity to water transportation.

I respectfully suggest that you investigate the opportunities and advantages Nevada offers industry for investment and expansion.

Cordially yours,

Vail Pittman
Governor

Vail Pittman

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

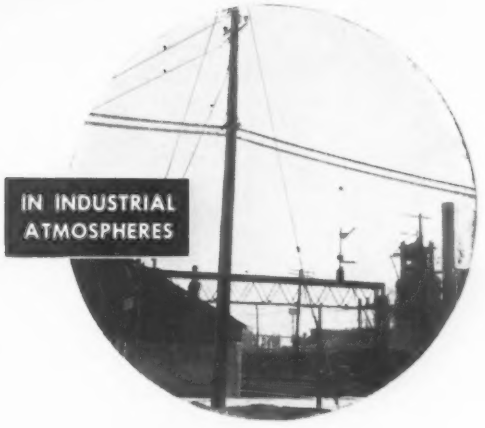
*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

RUST IS COSTLY!

PREVENT IT WITH



Copperweld
TRADE MARK

NON-RUSTING STRAND

It's the thick copper covering on each of the wires that prevents Copperweld Strand from rusting—and protects each of the strong alloy steel cores *permanently*. That's why Copperweld guys and messengers retain their original strength, provide dependable, trouble-free support year after year.

And since it can't rust, Copperweld Strand will cost you less in the long run—replacements just aren't necessary.

This rugged strand is versatile in the field. It can be bent, served, moused or clamped. The natural ductility of copper and the strength of the molten-weld eliminate danger of cracking, flaking or peeling.

Engineering Data will be sent on request.

COPPERWELD STEEL COMPANY
GLASSPORT, PA.
Sales Offices in Principal Cities

PACIFIC COAST OFFICE: MONADNOCK BUILDING, SAN FRANCISCO

Here it is...

the NEW FLEUR·O·LIER INDEX SYSTEM

THE GREATEST CONTRIBUTION TO LIGHTING SINCE FLUORESCENT!

Fleur-O-Lier Manufacturers proudly present to the lighting industry—the Fleur-O-Lier Index System—a method of specifying, identifying, and classifying fluorescent luminaires—with regard to their illumination characteristics.

There's been a long-felt need for a system of classifying fixtures—some method common to all who make, sell, specify or buy fluorescent fixtures.

This is it. It's simple, practical and basic.

"Why hasn't someone thought of this long ago!" say lighting engineers who have seen the Fleur-O-Lier Index System.

As Simple as A B C

WHAT IS IT?

The Fleur-O-Lier Index System is a simple method of identifying or describing any fluorescent luminaire on the basis of its illuminating performance.

WHY IS IT NEEDED?

Fleur-O-Lier Manufacturers devised the index system to give the "facts of light" about each luminaire. Because this classification quickly indicates the basic illuminating performance of a fixture, it eliminates vague generalities, broad but unfounded claims and gives needed factual data.

WHAT DOES IT ACCOMPLISH?

Its purpose is two-fold:

1. It provides an exact formula which the specification writer may use to

FLEUR·O·LIER *Manufacturers*

Fleur-O-Lier is not the name of an individual manufacturer, but of a group of fixtures made by leading manufacturers. Participation in the Fleur-O-Lier program is open to any manufacturer who complies with Fleur-O-Lier requirements.

• For SPECIFYING Lighting Fixture Performance

• For IDENTIFYING Fluorescent Lighting Fixtures

express the illuminating characteristics and performance he recommends.

2. It supplies a precise formula for fixture identification and classification that allows the buyer to *know* he's getting the illumination recommended.

WHO'LL USE IT?

Architects, lighting engineers, lighting consultants, lighting salesmen, contractors and **utility lighting men** . . . anyone who specifies or recommends lighting fixtures can use this simple, practical and fool-proof method to give an exact definition of the illuminating performance he selects for an installation.

Fixture manufacturers will use the system to indicate the performance characteristics of their fixtures.

Buyers and users will employ this method of indexing to make certain they are getting what the specifier recommends.

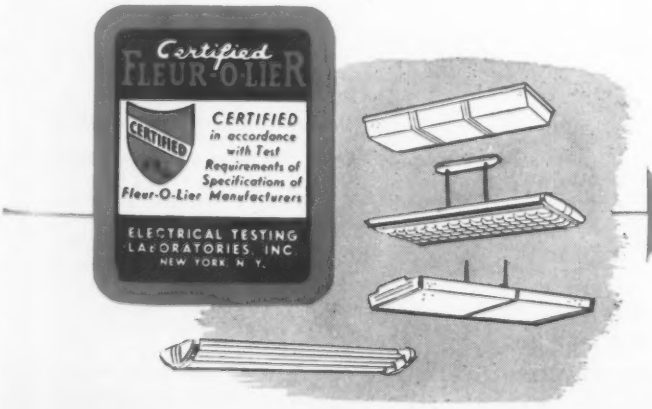
HOW DO I GET IT?

The Fleur-O-Lier Manufacturers have prepared a booklet which explains the Fleur-O-Lier Index System completely . . . what it is and how to apply it. It's complete with tables. Use the coupon below to send for your free copy of the new booklet.

AND HERE'S WHY YOU SHOULD INSIST ON THE FLEUR•O•LIER *Label*

The Fleur-O-Lier label means that the fixture was built to exacting specifications—then tested, checked and certified by Electrical Testing Laboratories, Inc. The Fleur-O-Lier label assures you of sound mechanical construction, safe and proper electrical design and materials, and tested, certified lighting performance.

To be sure of precise illumination characteristics, long trouble-free operation and complete user satisfaction—insist on the Fleur-O-Lier label.



Fleur-O-Lier Manufacturers
2116 Keith Building
Cleveland 15, Ohio

Gentlemen:

Please send me a free copy of the booklet describing the Fleur-O-Lier Fixture Index System and containing the Fleur-O-Lier Specifications and Testing Procedures.

NAME_____

COMPANY_____

STREET_____

CITY_____ STATE_____

What's the Difference

...that makes Westinghouse TYPE V DISCONNECTING SWITCHES the most dependable under all operating conditions?

Rotating-Insulator . . . Vertical Break
7 1/2 to 230 kv, 400 to 2,000 amperes.

YOU CAN BE SURE IF IT'S Westinghouse

Many important differences in design and construction contribute to the matchless dependability of the Type V Disconnecting Switch. But among them are four special advantages that contribute most to the kind of performance you want.

1. **It has no shunts to corrode or break**—nothing that requires periodic replacement.
2. **It has no exposed gears,** links or levers to encourage corona formation or radio interference.
3. **Contact pressure is completely released** before vertical break is started.
4. **All loaded bearings** on the live side are lubricated for life with Oilite bearings.

These advantages, in combination with smooth, completely enclosed, cam operation—only three parts move—assure positive, uniform opening and closing under all operating conditions. What's more, you enjoy this dependable, trouble-free service longer, too. Operating experience proves that Type V switches require only minimum attention to keep them in perfect operating condition for life.

For complete information on Type V Disconnecting Switches ask your Westinghouse or Westinghouse Distributor Salesman for B-3480-A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-60683

PROVED PERFORMANCE

Proved . . . at 20 below.

Proved . . . for temperature rise at rated current

Proved . . . at NEMA standard short-time ratings

Proved . . . at basic impulse insulation level

Westinghouse DISCONNECTING SWITCHES

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Install E. M. T. Faster and Neater with BRIEGEL Thin-Wall Fittings

NEATER • FASTER • STRONGER • APPROVED

All B-M Fittings Carry the Underwriters' Seal of Approval

FOR faster, neater and stronger thin wall conduit connections insist on either Briegel Indenter or Twiston Briegel Self-threading type all steel, one piece connectors and couplings.

B-M Indenter fittings, the only approved couplings and connectors of this type, have long enjoyed wider use and application than any other method of installing E.M.T.

The new B-M Twiston Self-threading fittings now make it possible to have threaded, raintight E. M. T. connections without the use of dies. Two complete turns with a pair of pliers threads the tubing and screws the fittings into a locked position, which results in the strongest connection possible and one that will withstand severe vibration.

Whatever the thin wall job might be, you will find that you can do it neater, faster and better with Briegel UL Approved E.M.T. fittings.

BRIEGEL METHOD TOOL CO.

GALVA, ILLINOIS

DISTRIBUTED BY

The M. B. Austin Co., Northbrook, Ill. Clifton Conduit Co., Jersey City, N.J. The Steelduct Co., Youngstown, Ohio Nat. Enameling & Mfg. Co., Pittsburgh Clayton Mark & Co., Evanston, Ill. Gen. Electric Co., Bridgeport, Conn. Enameled Metals, Pittsburgh, Penn. Kondu Mfg. Co., Ltd., Preston, Ontario

YOU START SAVING—

AS SOON AS YOU START PLANNING

Regardless of the size and type of substation you need, you can now cut out costly months of detailed planning by going directly from *the job to be done* to *the complete substation for the job.*

This is made possible by General Electric's *package substation*, which gives you—as a unit—a complete, co-ordinated package including one or more master unit substations, steel structure and *all* other electric equipment to match your exact needs. It extends the vital "buy it complete" trend throughout ratings from 750 to 45,000 kva; 11 to 69 kv, incoming, and 2.4 to 13.2 kv, outgoing.

You have hundreds of package substation combinations from which to select. The one to match your next specific application is likely shown in GEA-4500 (left). This helpful, 78-page bulletin describes 30 standard classes of package substations, gives you helpful application information on each,

You can go directly from a simple one-line diagram of *the job to be done to the complete substation for the job.* You can see that substation—as clearly as if it were installed just outside your window—with the aid of large, clear photographs in GEA-4500 (left, below).

A PACKAGE SUBSTATION*

and shows you just how each will look installed. From these—and the hundreds of standard modifications—it's easy to select a package substation having the exact ratings, functions, circuits and physical arrangement for your job.

Whether your substation is to be small or large, simple or complex, you need prepare but *one specification*, place but *one order*.

Your General Electric sales representative can provide a copy of GEA-4500, and will gladly work with you on any substation application you have in mind. *Apparatus Dept., General Electric Company, Schenectady, N. Y.*

. . . and your savings continue for years

Installation is easy and economical. Your package substation arrives in factory-assembled sections as large as shipping and handling facilities permit. It includes everything you need—right down to complete erection instructions. You can put the complete substation on the job quickly, easily, and economically.

You get a valuable flexibility for future needs. Centralized design of G-E package substations permits exceptional flexibility to meet changing load requirements. Capacity can be added—or removed—in easily handled "blocks of power," to take care of increased load requirements, load shifts or relocations. You avoid costly modification of installed equipment, achieve a more economical use of your installed capacity.

Full co-ordination of all parts gives you a better, more dependable substation. The package substation you order passes from the drawing board through the factory as a **unit**, receiving centralized supervision of the over-all design and assembly. The result is full co-ordination—mechanically, electrically, and thermally—that pays off in years of increased dependability and reduced maintenance.

GENERAL ELECTRIC

821-53

"8 Years of Constant High Temperatures

——————— *and our Rockbestos A.V.C. is Still Going Strong!"*

Read HOW and WHY the Plant Engineer of a Large Rubber Company Specifies Permanently Insulated Wire and Cable for Hot-Spot Circuits.

"In 1940, when we revamped our boiler room, we rewired our lighting and power systems completely with Rockbestos A.V.C. wire and cable.

"The asbestos-varnished cambric insulation continues to do its job under constant high temperatures approximating 140°F.

"Where ordinary wire and cable gave us frequent trouble, Rockbestos A.V.C. gives entire satisfaction.

"Whenever we have need of wire or cable for use under extreme temperatures you can count on us specifying Rockbestos!"

This tested-in-service story is one of many which proves that you can protect your circuits by using the right wire for a tough job — specify Rockbestos A.V.C. Write for the new catalog showing all types.

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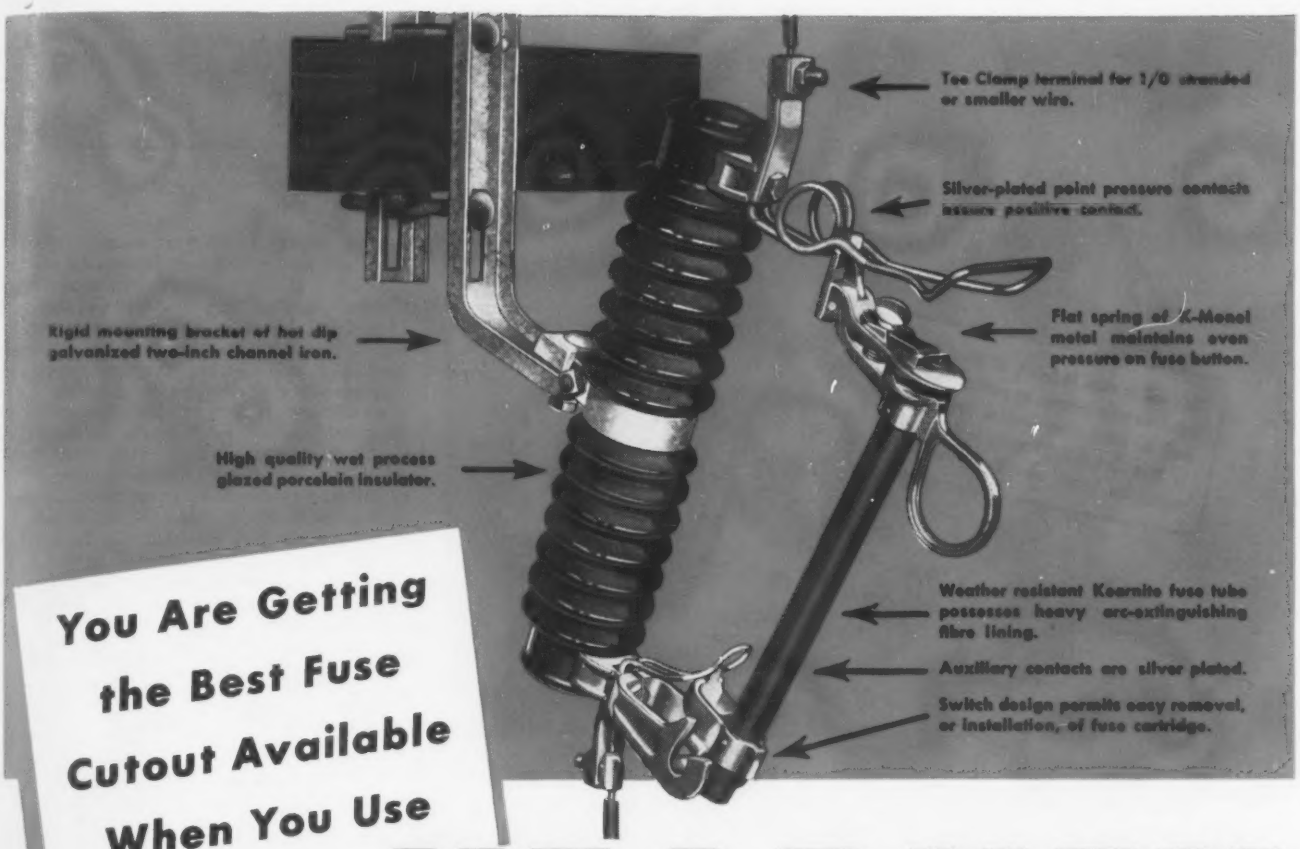
NEW HAVEN 4, CONNECTICUT

OFFICE AND WAREHOUSE, OAKLAND MUNICIPAL AIRPORT, OAKLAND, CAL.; LOS ANGELES DISTRICT OFFICE, 6919 SAN FERNANDO RD., GLENDALE, CAL.

ROCKBESTOS

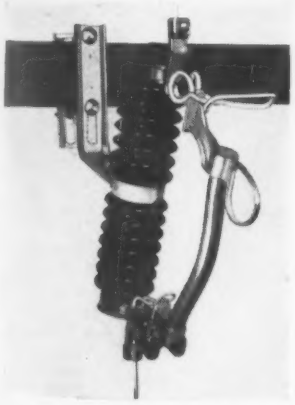
THE WIRE WITH PERMANENT INSULATION


Tee Clamp terminal for 1/0 stranded or smaller wire.
Silver-plated point pressure contacts assure positive contact.
Rigid mounting bracket of hot dip galvanized two-inch channel iron.
Flat spring of K-Monel metal maintains even pressure on fuse button.
High quality wet process glazed porcelain insulator.
Weather resistant Kearnite fuse tube possesses heavy arc-extinguishing fibre lining.
Auxiliary contacts are silver plated.
Switch design permits easy removal, or installation, of fuse cartridge.

You Are Getting the Best Fuse Cutout Available When You Use

KEARNEY

Series "T" TRIP-OUTS



As with all other Kearney Fuse Cutouts the Type "T" Trip-Out can be converted to a disconnect switch by the substitution of a disconnect blade for the fuse cartridge.

Significantly superior to the average fuse cutout, the Kearney Series "T" Trip-Out represents the very latest developments.

In brief, features of this cutout are: Silver to silver contacts to accommodate heavy loads and to preserve current carrying efficiency. Simplified toggle cartridge release at upper end of the cartridge to make sure of the tripping action on very light as well as heavy fault currents. Heavier cartridge trunnions and switch hinges for guiding the cartridges into the switch contacts.

Try this new, improved design now.

FOR BETTER CONSTRUCTION AND MAINTENANCE

Always Specify **KEARNEY PRODUCTS** *for the Job*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

4224-42 CLAYTON AVE. – ST. LOUIS 10, MISSOURI

Canadian Plant, Guelph, Ontario

JRK-122

West Coast Distributor: **MAYDWELL and HARTZELL,** INC.

This coil is used in 5KVA oil-filled distribution transformers by public utilities and in rural electrification programs to step down 2300 volts to 110-220 volts for home and farm service.

Now

a tape that works successfully in oil filled transformers!

Here's an electrical tape that has been doing a dependable job of holding coils, edging insulation, etc., in oil filled transformers. It speeds up coil winding and securely holds layer insulation, taps, spacers, etc.

It is No. 38 "SCOTCH" Electrical Tape, with a tough creped Kraft backing and thermo-setting pressure-sensitive adhesive. The flexible backing makes it easy to apply, and the adhesive has plenty of strength for holding coils, leads, spacers and insulation. The normal baking process cures the adhesive and bonds it permanently to the coil parts.

No. 38 is only one of the many types of electrical tape that bear the reliable "SCOTCH" name. If you'd like to see the new catalog that tells about all of the many specialized "SCOTCH" Electrical Tapes, just write to Dept. E-1 at the address below.

No. 38

REG. U.S. PAT. OFF.

SCOTCH *Electrical* **TAPE**

BRAND

ANOTHER 3M COMPANY PRODUCT

Made in U.S.A. by MINNESOTA MINING & MFG. CO. St. Paul 6, Minn.

General Export: DUREX ABRASIVES CORP., 63 Wall St., New York 5, N. Y.

In Canada: CANADIAN DUREX ABRASIVES LTD., Brantford, Ontario

PRODUCT NEWS

Shunt Capacitors (1200)

Line Material Elemex shunt capacitor tanks are now completely fabricated of non-corrosive stainless steel. Exteriors are "Hydis" treated and require no painting. This finish is an oxidization process creating a deep-blue surface on the stainless steel and said to improve heat radiating characteristics of the entire assembly. This new surface treatment provides excellent electrical contact to hangers, according to the manufacturer, and eliminates tank grounding problems. Electrical contact is established to the supporting metal hangers without necessity of removing paint film.

These capacitors are available in 15- and 25-kvar. sizes. It was decided to maintain the same elevation of terminals above hanger flanges as was standard in each voltage class

of the 15-kvar. rating. This allows replacement of existing 15-kvar. units with 25-kvar. sizes or mixing of both sizes in the same hanger without modification of terminal leads. The company's parallel-groove terminal connector is retained in the new designs.

Identification from the ground is simplified by the manner of mounting. In the 15-kvar. design, the mass of tank above and below the hanger support is about equal; in the 25-kvar. rating, approximately two-thirds of the mass is below the hanger.

The company's new "Life-Time" bushing is solder sealed to the capacitor cover.

Voltage Stabilizer (1201)

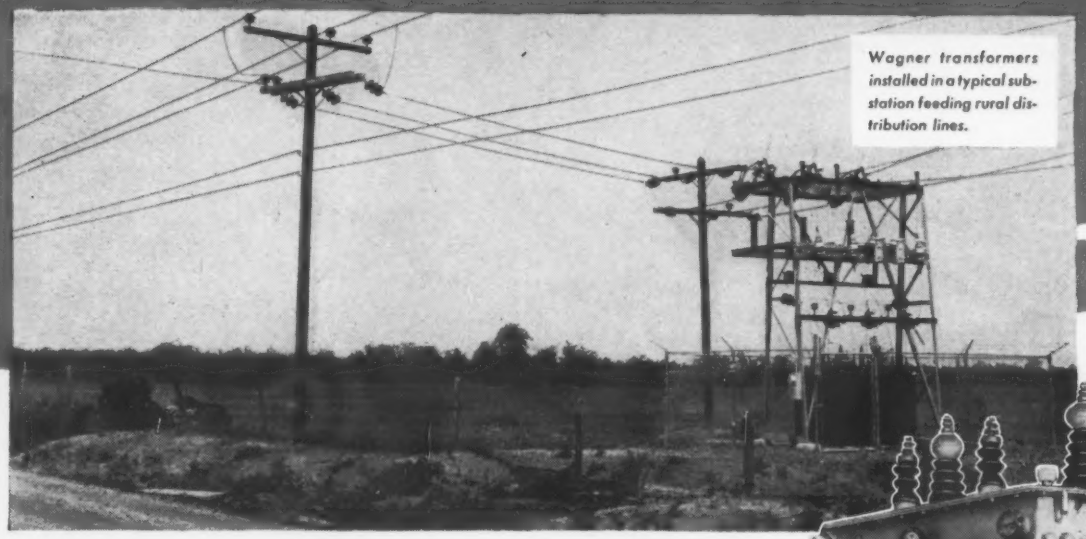
Raytheon Mfg. Co. is offering as an addition to its voltage stabilizer line a hermetically sealed, frequency compensating 15-watt model, for an input frequency range of 57 to 63 cycles, input voltage of 95 to 125 and output of 115 volts stabilized to plus or minus 1% for line and frequency regulation.

Differential Analyzer (1202)

Released from the Navy classified material list, Reeves Electronic Analog Computor, a standard commercial electronic differential analyzer, is available to the public. The REAC is claimed to solve with a high degree of accuracy any initial valued differential equation up to the seventh order. Two or more units may be interconnected to handle problems of higher order, it is stated.

THEY'RE PART OF THE PICTURE...

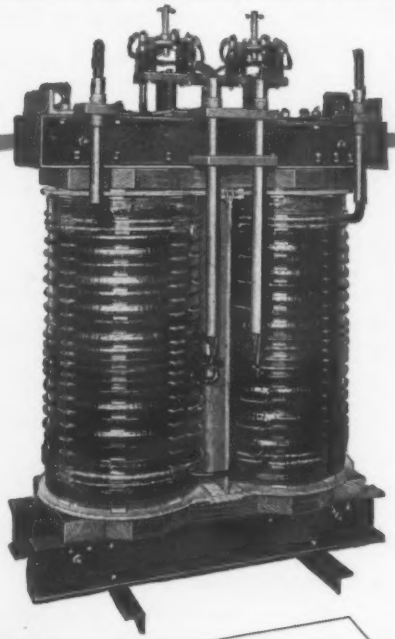
Wagner Substation Transformers for RURAL APPLICATION



Wagner transformers installed in a typical substation feeding rural distribution lines.

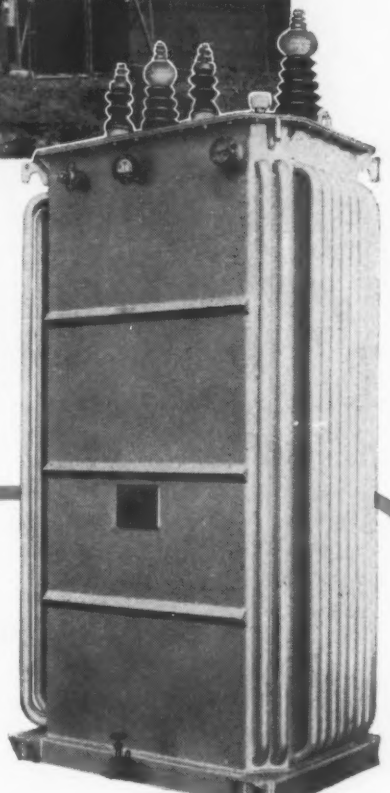
WAGNER builds a complete line of oil-filled, self-cooled transformers for substation operation on distribution systems. Hundreds of these transformers are supplying many of the rural-line systems in operation throughout the country. They are available in all standard kva and voltage ratings with standard accessories.

Wagner transformers are nationally known for their high standard of quality and performance based on a background of a half-century of designing and building distribution and power transformers. Trained field engineers in our 29 branch offices, located in principal cities, are ready to help solve your Rural-Line Transformer problems.



Pictured at right is a 500 kva 46000 to 7200 volt, type HEL transformer. These units are available in sizes 150 to 500 kva in standard voltage combinations up to 69 kv.

The element, shown at left, is a typical core-type element, like those generally used in transformers of this classification. Note its simple design and sturdy construction . . . built for years of rugged service.

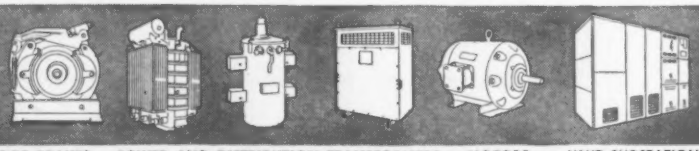


Bulletins TU-180 and TU-181 give full information on Wagner Substation Transformers. Write for your copies.

Wagner Electric Corporation
6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

Wagner Electric Corporation EST. 1891

Consult Wagner Engineers on All Transformer Problems



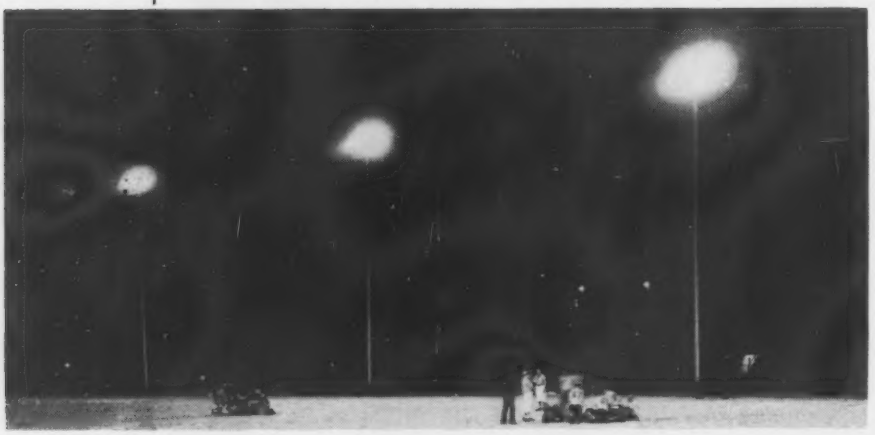
BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL AND AUTOMOTIVE PRODUCTS

T48-10

S&M Better Lite-ing

BACKED BY 40 YEARS LEADERSHIP



FROM LARGE OUTDOOR LITE-ING JOBS
TO INDUSTRIAL LITE-ING INSTALLATIONS

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CAN ASSIST YOU
WITH ALL YOUR
FLOOD LITE-ING
PROBLEMS

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Let us assist you in giving your clients jobs that mean years of top performance—both in S & M Lite-ing equipment itself and its important functioning. Ask to have an S & M Better Lite-ing representative call and show how we can work most efficiently with your organization to insure lite-ing satisfaction... at a saving of your time and effort.

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Switchboard Instrument (1203)

Cole Instrument Co. has released its Model 8A6 switchboard instrument, scale length, 5.12 in., accuracy 1% (½% accuracy at additional cost). This instrument is 5½x5½ in., surface type, back connected with cast aluminum case, dull black finish, 5-ft. leads are furnished for use with external shunts. High torque to weight ratios are maintained throughout the series, according to the manufacturer. D-c instruments are permanent magnet moving-coil type. A-c instruments are moving-iron type

for use on frequencies from 25 to 135 cycles and can be supplied for higher frequencies, including 400 and 800 cycles at additional cost. Extremely low-range millivolt meters are extra heavily damped.

Thermal Load Relay (1204)

A transformer thermal load relay announced by Westinghouse is actuated by a bimetal mounted in the top oil zone; continuously evaluates the hottest-spot temperature of the copper windings to operate three snap-action self-resetting switches. The first switch operates with increase of transformer load to start cooling fans. The second switch closes to give warning, if load increases and approaches the safe thermal operating limit. If thermal limit is reached, the third switch either trips the breaker or gives an alarm.

Control Center (1205)

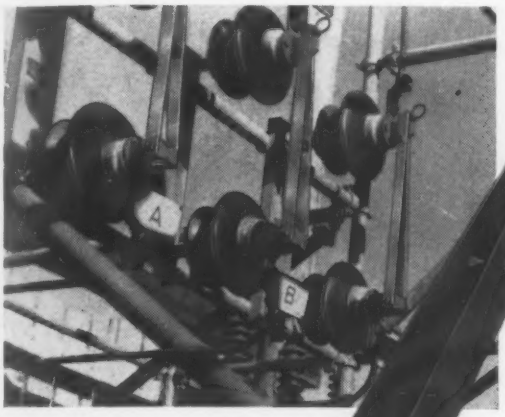
Square D's Class 9838 dust-tight control center combines standard, general-purpose control center units with heavily gasketed vertical sections. Each vertical section is an independent enclosure of heavy-gage steel. Motor control units are mounted entirely within the dust-tight sections. Units are available with circuit breakers through 600 amp., starters through NEMA size 5, lighting transformers and panelboards and other miscellaneous devices as covered by NEMA standards. Master load and control terminal blocks are optional.

Weatherproof Wire (1206)

RoLene weatherproof, a polyethylene-covered wire, has been added to the Rome line in sizes from No. 12 through No. 4 AWG with solid bare copper conductors and in sizes No. 2 and No. 1 AWG with concentric stranded (7 wires) bare copper. Conductors may be furnished as soft, medium hard drawn, or hard drawn in accordance with ASTM specifications. This wire is claimed to offer advantages of moisture resistance, long life with no braids, lighter weight and smaller diameter, excellent resistance to abrasion, sunlight and other weather hazards.

CHANCE Type BN-BT Switches*

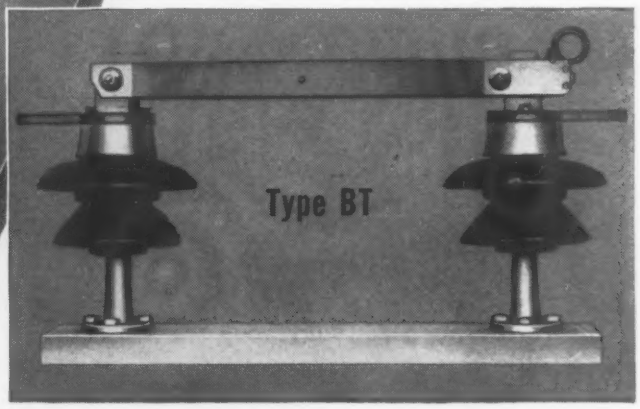
Hook Stick Operated



Type BN

For all types of Single Pole Installations

400 to 2000 Amp.
7.5 to 161 Kv.



Type BT

Chance Hook Stick Operated Disconnecting Switches are made in a complete range of capacities in all voltages up to and including 161 Kv. They are available in single or double throw types for horizontal mountings—upright or underhung, and for vertical mounting up to 115 Kv.

● Sturdy Construction . . . High Conductivity
Chance BN and BT switches are ruggedly built throughout. Trussed blades add rigidity. All current carrying parts are constructed of high conductivity copper.

● Positive Blade Latches
Spring latches secure the blades in the contact clips and prevent opening under short circuits.

● Self-Aligning Clips
Contact clips on the BN switch are of the spring type which make positive contact even though blade may be slightly out of line. Tapered tongue on BT type guides blade to proper position—contact pressure is adjustable.

● Long Life Contacts
Silver surfaced area contacts are provided for long life.

* CHANCE SWITCHES (FORMERLY BOWIE) ARE BACKED BY 42 YEARS OF SWITCH ENGINEERING AND MANUFACTURING EXPERIENCE.

A·B·CHANCE CO·

210 N. ALLEN STREET CENTRALIA, MISSOURI · 615 TENNESSEE STREET SAN FRANCISCO 7, CALIFORNIA

ABC INDUSTRIES

C4810

ANNOUNCING THE NEW
SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.
CONSTELLATION
SLIMLINE
After months of laboratory and engineering research, SMOOT-HOLMAN now introduces CONSTELLATION a new instant-start, high efficiency SLIMLINE luminaire.
For better merchandising in stores, service stations, etc. For better sight in schools (shielded model available soon), offices and other applications where fluorescent lighting is desired.
CONSTELLATION takes the 96" slimline lamp.
SMOOT-HOLMAN COMPANY • INGLEWOOD, CALIF.
Offices in Principal Western Cities Branch and Warehouse in San Francisco

Distribution Transformers (1207)

Wagner has announced two types each of single-phase and 3-phase dry-type distribution transformers for providing specific voltages for auxiliary lighting and power circuits. Two-winding dry-type transformers are built as single-phase type AE in sizes 250 va. to 200 kva. and as 3-phase type AP in sizes 3 to 300 kva., in the 600-volt class and below. Dry-type autotransformers are built as single-phase type AA, in sizes 500 va. to 25 kva. and as 3-phase type AM, in sizes 5 to 50 kva., both types 240 to 240/120 volts. All have class A insulation and are rated 55 C. rise continuous duty.

Construction of single-phase, 2-winding units through 10 kva. and of single-phase autotransformers through 25 kva. makes these ratings suitable for either indoor or outdoor installation.

All 3-phase units and single-phase 2-winding units larger than 10 kva. are enclosed in sheet steel cases with screened ventilation openings. They are designed for floor or platform mounting and are suitable for indoor service only.

Manual Starting Switches (1208)

G-E is offering a new line of manual starting switches for use with fractional horsepower motors. They are furnished in five types: with or without general-purpose enclosure; a combination unit and selector switch; with cast iron enclosure for wet locations, and a similar type for dusty or hazardous locations. All types have a molded base of moisture-resisting insulating material that mounts and encloses the mechanism and contacts. The switch handle moves to the off position on overload, giving positive indication that power is shut off.

Electronic Recorder (1209)

Foxboro's multi-record Dynalog electronic recorder is a high-speed instrument, making from one to six records on one circular chart. Records are of colored dots so closely spaced as to make virtually continuous lines. The recorder has only one measuring system, either resistance bulb or EMF type, but a positive-acting switching unit automatically brings the varicolored pens into recording position at 6-second intervals, in any sequence desired. The sequence and number of points may be changed at will. Complete color coding prevents possible mismating of circuits and pens.

Variable Resistor (1210)

A 15/16-in. variable resistor has been announced by P. R. Mallory & Co. Called the Midgetrol, it is claimed to be space-saving and to have electrical characteristics making it suitable for many applications previously requiring a 1⅛-in. control. A new feature is a flat shaft that may be adapted to fit any type of knob now in use.

STANDARD ENGINEER'S REPORT

RPM CALOL

TEST DATA

UNIT G.E. 50,000 KW Steam Turbine — Horiz. Steeple Compound. Steam-1250 lbs. - 750° F.

LUBRICANT Calol OC Turbine Oil—9

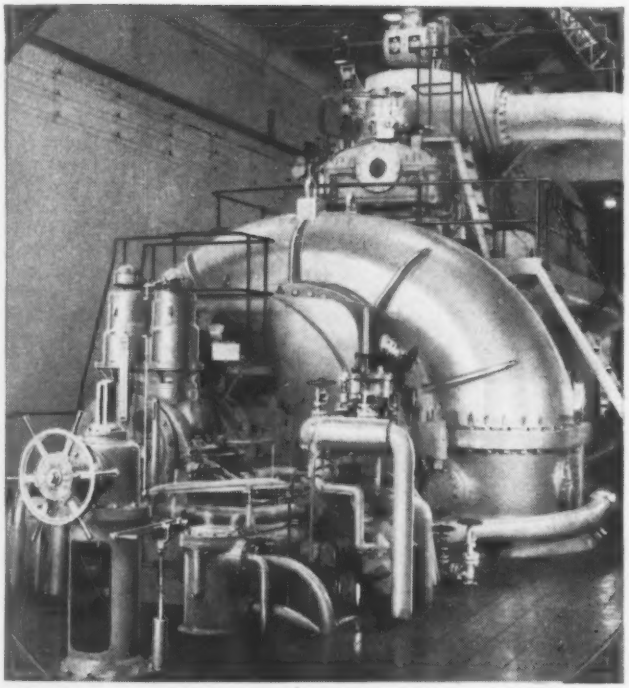
TEST PERIOD 4 Years —

CONDITIONS Operation of Generator

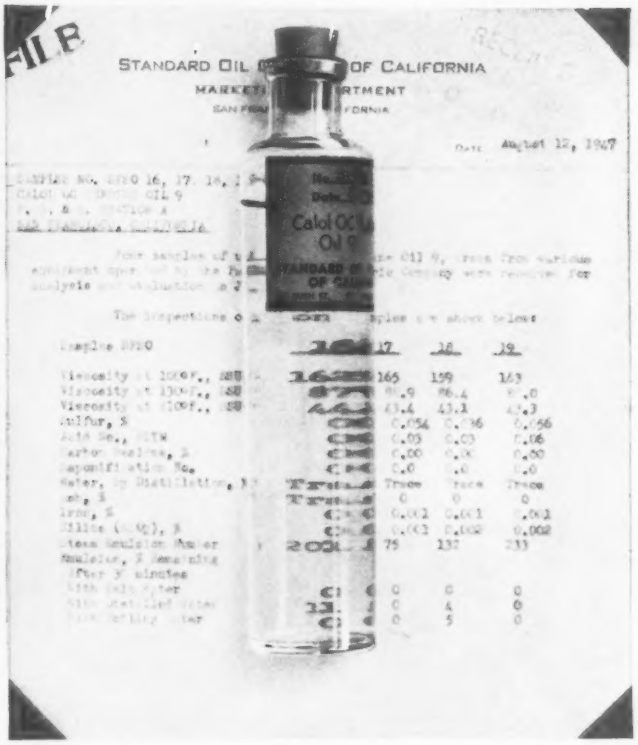
LOCATION San Francisco Station A

FIRM Pacific Gas & Electric Co.

SAME OIL CHARGE USED IN TURBINE FOUR YEARS SHOWS NO DETERIORATION



More than four years ago the lubrication system of this turbine-generator was charged with Calol OC Turbine Oil—9. After continuous operation on this same oil charge during all of that time, a laboratory analysis showed the oil had not increased in acidity or deteriorated. Inspection of lines, sumps, and governor control mechanism showed them to be clean and free of sludge and lacquer. Journals remained in good condition. Calol OC Turbine Oil resists both oxidation and corrosion.



Note how clear this sample of the Calol OC Turbine Oil charge remained after 4 years of use - figures can be read through it and there is no deposit at the bottom of the bottle. The actual specifications of the used oil from the turbine-generator is one of the four sets shown here.

REMARKS: Calol OC Turbine Oil is specially compounded to provide long service and give full protection to all vital bearing surfaces. It contains a highly effective oxidation inhibitor which resists the action of air, heat and moisture, preventing sludging and lacquer formation, reducing oil maintenance costs to a minimum. Its corrosion inhibitor and excellent metal-wetting ability stop rusting, even in initial operation of turbines. Calol OC Turbine Oil is made in five grades to meet various installation conditions.

STANDARD TECHNICAL SERVICE conducted and reported this test: If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20.

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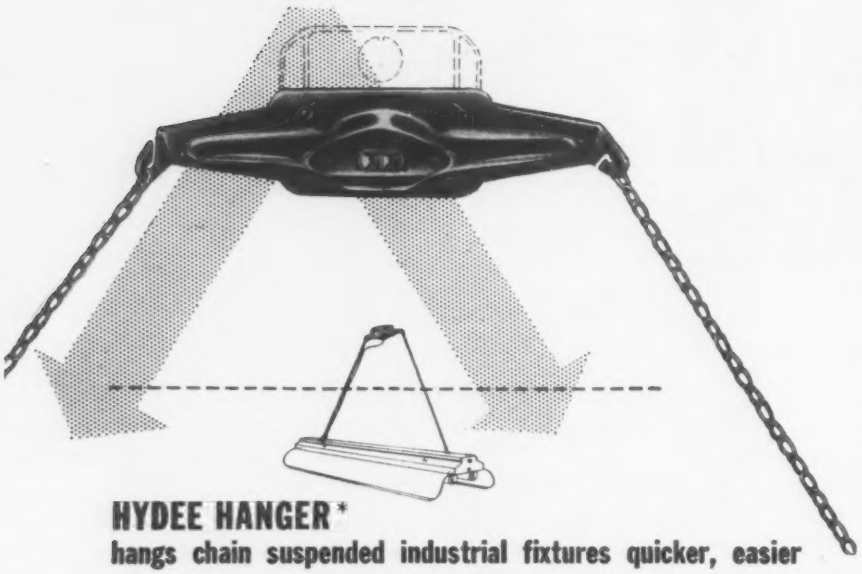
Slater ELECTRIC & MFG. CO. WOODSIDE, NEW YORK
Cole ELECTRIC CO.



HYDEE HANGER*
hangs chain suspended industrial fixtures quicker, easier

A screwdriver is all you need . . . for new or "change-over" jobs. Fits standard 4" or 3¼" outlet box or plaster ring. Self-grounding . . . you can use 2-wire cord and plug. **Complete** with receptacle, two 5-foot chains, spring wire "S" hooks and cord clips.

$1.65 LIST

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

011

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

*Patent No. D-141624 and No. 440914
Underwriters approved.

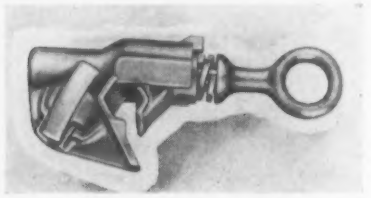
Wood Crossarm Braces (1211)

Locke Inc. is offering new wood crossarm braces. The wood member of the brace, furnished in a standard 1⅝x2⅝ in. finished cross section, is of West Coast fir. When desired, it is furnished creosote treated. Because of the large wood cross section, either of the two wood braces may prevent unbalancing of the crossarm, should one be damaged. All metal fittings are of No. 9 gage steel and are galvanized by a double-dip perma-zinc method.

Tap (1212)

Allied Electric Products is offering an all-rubber Tapmaster cube tap which it claims incorporates a special assembly feature to eliminate internal arcing, and is unbreakable and tamper-proof. A patented assembly feature allows the contacts to be secured permanently in position. In actual assembly, the rubber is expanded and the assembled contacts are inserted into the molded rubber. The rubber is then allowed to contract, enclosing the contacts and holding them in place. Listed by Underwriters'; available in brown only; rated 10 amp., 250 volts; 15 amp., 125 volts. CSA Canada rating, 660 watts, 250 volts.

Hot-Tap Clamps (1213)



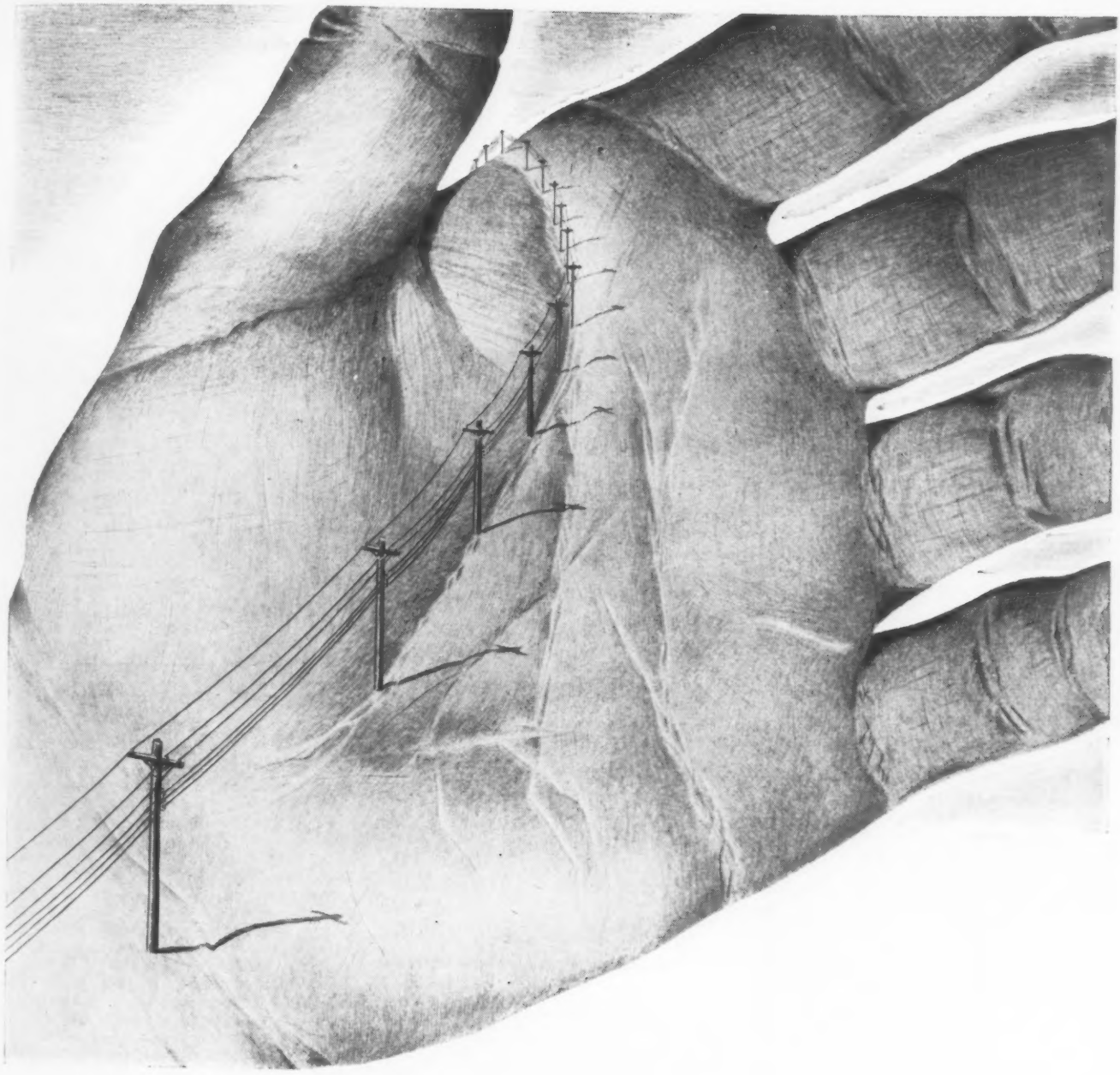
A. B. Chance Co.'s new hot-tap clamps have a protective hood for working parts, enclosing a sealed, waterproof, thread chamber containing a corrosion-resisting compound. A longer contract area gives better current distribution, according to the manufacturer, and several points of contact are maintained with each of the six outside wires of a 7-strand conductor. The clamp is said to remain securely fastened on 3-strand conductors in any position. These clamps are available in three body types: for aluminum or steel connections; for copper connections; for copper to aluminum or aluminum to copper. Two sizes fit conductors from No. 8 solid or No. 8 ACSR to 250,000 CM stranded copper or 4/0 ACSR or No. 2 ACSR with armor. The jumper terminal will hold 2/0 to No. 8 solid jumper wire.

Cutter (1214)

Wiremold announces the addition of its No. 657 canopy cutter, a hand punch designed to cut fluorescent fixture canopies to take 500 or 700 Wiremold raceway.

Anchors (1215)

Holub Industries announces that Sand-Scott plastic expanding screw anchors are now available in an assortment kit, along with three carbide-tipped masonry drills.



Make Duraline your Life "Line"!

MILES AND MILES of Duraline* URC weatherproof wire, up for years, have proved the superiority of this unusual weatherproof.

Duraline is designed to provide vastly improved performance during emergency periods. Interlocked felted layers, combined with URC saturants and finishers, form a fibrous sheath that effectively retards moisture penetration—even during long periods of wet weather.

Here is weatherproof that is truly *weather-resisting*. For satisfied customers—and lower maintenance costs—invest in DURALINE URC WEATHERPROOF! Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 48168

*Reg.U.S.Pat.Off.

ANACONDA
from mine to consumer

Duraline URC WEATHERPROOF

STAYS PUT!

R&S LIGHTING FIXTURES

VAPORTIGHT...
EXPLOSION-PROOF...
DUST-TIGHT...

For safe and correct lighting in hazardous areas, count on R & S Lighting Fixtures to stand up better . . . to deliver long-term, top performance . . . because of illumination engineering ingenuity and over forty years' manufacturing know-how.

Scientific design with high reflection factor provides maximum, safe, controlled lighting . . . maintenance-free. Standardized base common to all sizes. Interchangeable reflector globe assemblies of various capacities. Simplified mounting without disturbing electrical connections; with a variety of conduit arrangements in one standard base. Underwriters' laboratories approved.

Write, on letterhead for new catalog H-47.

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RUSSELL & STOLL COMPANY, INC.
Precision-Built Electrical Equipment
125 BARCLAY STREET, NEW YORK 7, N. Y.

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Crapo GALVANIZED PRODUCTS

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Vibration-Proof Clamp (1216)

Thomas & Betts is offering a new type vibration-proof hot-tap clamp for use as a transformer tap and for connecting coupler units of telephone systems to power lines. Special features are: vibration-proof design; protected lubricated threads; belled mouth for ease of wire entrance; wide contact surface area; phosphor-bronze spring to take up wire "set"; weight, 10 1/3 oz. According to the manufacturer, heat run tests show that the clamp consistently runs cooler than the cable on loads of from 50 to 125 amp. Each No. 650 hot-tap clamp carries 5 ft. of No. 6 dead soft-annealed copper tap lead wire permanently connected to the fitting by the T&B compression method.

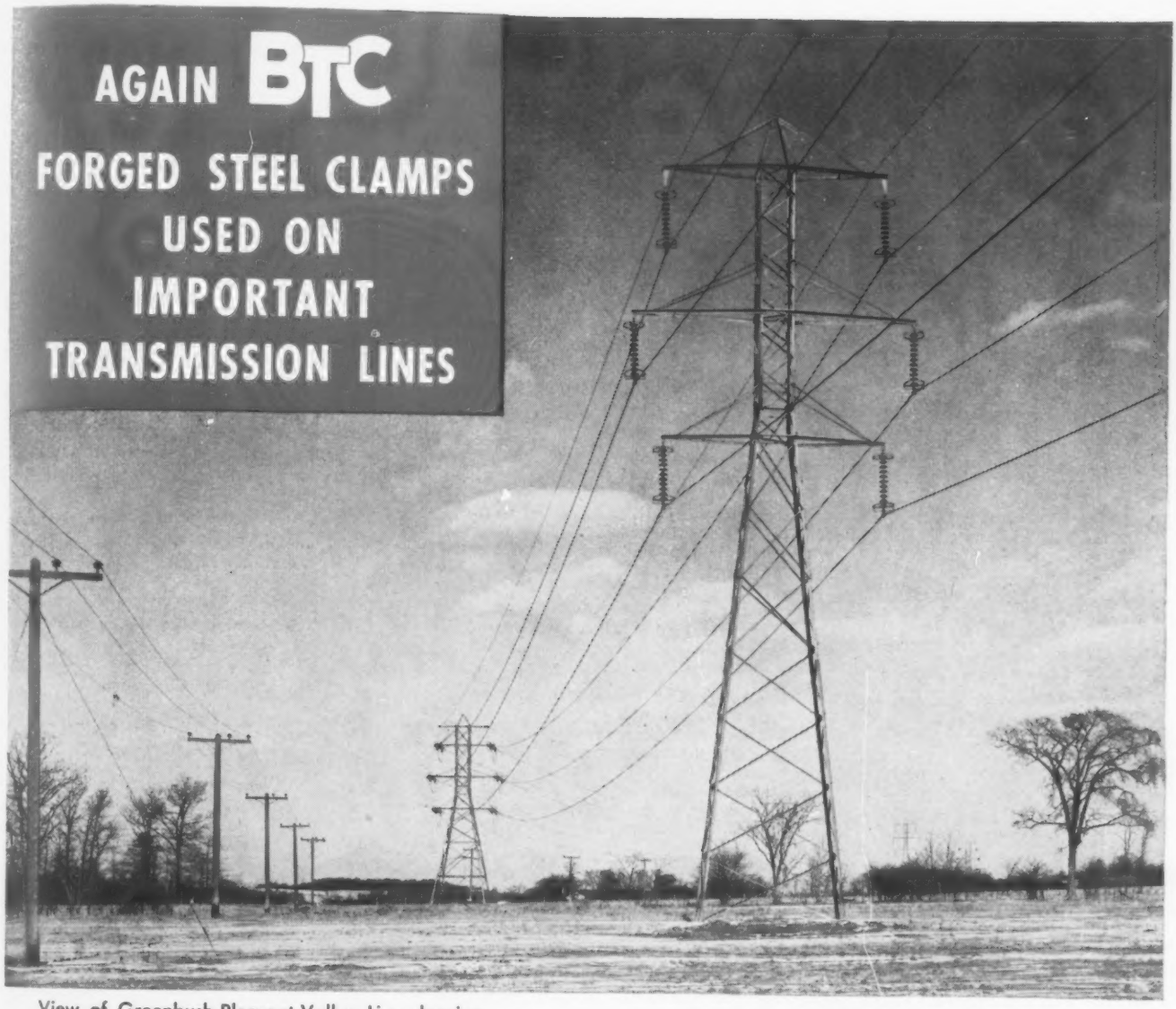
Measuring Instrument (1217)

James G. Biddle has developed a portable, direct-reading instrument for measuring turn ratio in power transformers. This set is for use on all types and sizes of power, distribution and autotransformers in common use. It consists of a multiratio reference transformer, excited, by means of a small hand generator, in parallel with the transformer under test. By means of four dial switches and a null balance indicator, the reference transformer is adjusted in ratio to equal that of the transformer under test. The ratio is then read directly from the dial switch indexes. Ratios up to 130 can be measured with an accuracy to within one part in 1,000, according to the manufacturer.

Magnetic Relays (1218)

Ward Leonard's Bulletin 102 miniature magnetic relays are for automatic and remote-control circuit applications where space is limited. They measure 1⅛ in. high, 1⅝ in. long and 1 in. wide; have a metal base and solder-type terminals. Are suitable for operation directly on 115 volts a-c, 60 cycles or 32 volts d-c; have DP, DT silver contacts rated at 3 amp., 115 volts, 60 cycles maximum for non-inductive loads.

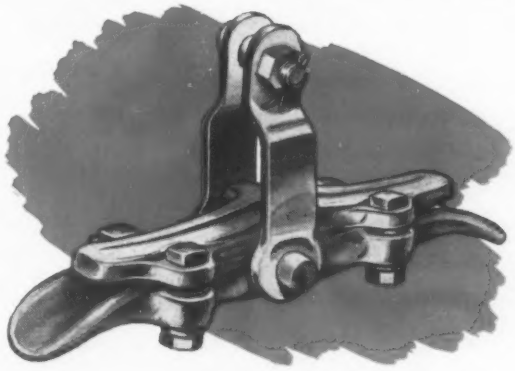
AGAIN BTC FORGED STEEL CLAMPS USED ON IMPORTANT TRANSMISSION LINES



View of Greenbush-Pleasant Valley Line showing semiflexible "A" frames and square strain tower.

In order to join the Niagara-Hudson system with New York City, the New York Power and Light Corporation constructed a 64-mile tie-line from Greenbush, N. Y. (southeast of Albany) to Pleasant Valley, N. Y. (east of Poughkeepsie). Built in 1931, this 110 kv. line features double circuit galvanized steel semiflexible suspension structures and square strain towers. The power conductors are 605,000 cm. 26/7 A.C.S.R. using armor rods; ground wires are two ½" diameter, extra high strength, 7-strand Copperweld.

Controlled-slip forged steel Suspension Clamps produced by BTC are used throughout this line on the power conductors. BTC Forged Steel Caps are also used on the Suspension Insulators. BTC Forged Steel Line Hardware is selected for important transmission lines because of correct design features and economy in maintenance.



Sold only through your insulator manufacturer.

THE BREWER-TITCHENER CORPORATION, CORTLAND, N. Y.

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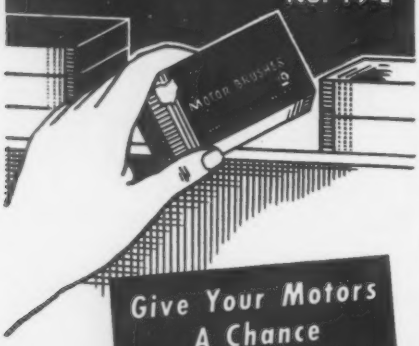
AT YOUR
Fingertips
WITH
REFERENCE BOOK
No. 19-E



Give Your Motors
A Chance
EQUIP THEM WITH
OHIO
MOTOR
BRUSHES

ORDER AN ADVANCE STOCK AND INSTALL AT A MOMENT'S NOTICE

In Catalog 19-E, brushes are listed alphabetically by motor and equipment manufacturers name. At least 15,000 styles of motors are listed. It's a plain "dollars and sense" policy to order an adequate stock of emergency brushes, a few sets of each, and preserve economy in your motor maintenance.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Photoelectric Counter (1219)

For industrial application, Potter's new Model 310 photoelectronic counter is claimed to count up to 6,000 per minute. It is a completely self-contained package including photoelectric detector, one electronic decade and a 6-digit electromechanical register.

Humidity Control (1220)

A humidity control system for barns, livestock and farm equipment is offered by Minneapolis-Honeywell Regulator Co. It will control fans and other devices, automatically maintaining temperature and humidity at desired levels, according to the area in which installations are made.

Power Tool (1221)

Magna Engineering Corp. offers the Shopsmith, multi-purpose power tool 59 in. long and 21 in. wide, functioning as five standard too's—circular saw, lathe, disc sander, horizontal drill press and vertical drill press. All operations use the same ½-hp. motor. The change from one tool to the other requires less than one minute, it is stated.

Bushing (1222)

Adalet Mfg. Co. is marketing an insulating bushing, which it claims is precision molded to close tolerances and is reinforced to give maximum dielectric and mechanical strength. These bushings may be used with insulating covers; meet code requirements; are available in a complete range of sizes, the announcement states.

Anchor (1223)

Albion Malleable Iron Co. has a new expanding-type, cone-slant anchor claimed to withstand a 46,000-lb. pull. Comes in three hole sizes, 3, 4 and 6 in., with two variations of blade spread in the 6-in. size.

Pipe Bender (1224)

A portable hydraulic pipe bender offered by Electric Cord Co. features light weight (jack and frame, 83 lb.), removable hydraulic jack, open-jaw construction. Comes with ¾-, 1-, 1¼,- 2- and 2½-in. dies.

Lamp Holder (1225)

An adjustable lamp holder has been designed by G-E as a companion piece to its PAR-38 projector or flood lamps. Designated as type L65P, the lamp holder consists of a steel base and stand attached by means of a wing nut clamp to a die-cast zinc socket housing. The base is made to fit standard 3¼- and 4-in. outlet boxes. The socket is sealed against moisture and dirt by a treated asbestos gasket molded to shape to gasket the joints between the 150-watt PAR-38 lamp and holder. Holder comes with a twin-conductor, weatherproof cord.

Electronic Lamp (1226)

An electronic lamp, Type A-H12 or B-H12, utilizing cadmium and mercury vapors radiating only one-third as much heat per watt as incandescents, has been announced by Westinghouse. The lamp was designed chiefly to simplify the lighting of movie sets and television studios.

C. D. LaMOREE
Electrical Insulation

The Spaulding Fibre Company, Inc.
Fibre — Spauldite
Spauldo and Transformer Board

Irvington Varnish & Insulator Co.
Varnish & Varnished Products

The Hope Webbing Company, Inc.
Electric Tapes and Sleevings
Glasflex

Owens Corning Fibreglas Corp.
Fibreglas Tapes, Sleevings and Tying Cords

Dow Corning Corp.
Silicones
Varnish and Motor Insulation

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of SMALL
TRANSFORMERS

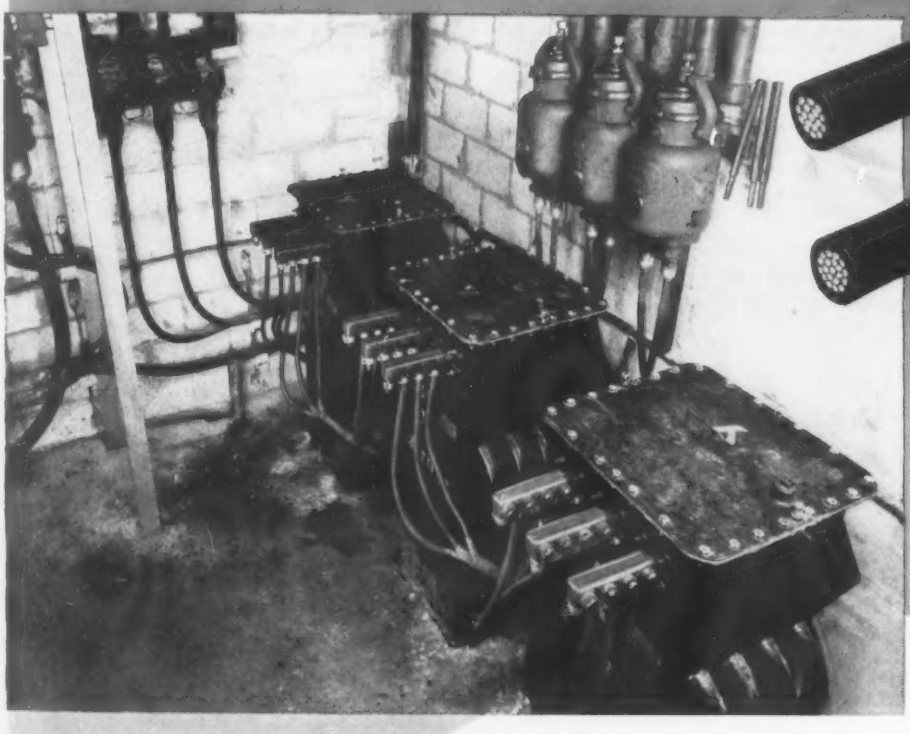
—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformer to exactly match your requirements. If not in our regular line, we build to meet your specifications in a hurry!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

BURNDY
STUD MOLE
(Type KMLD)



Simplifies multiple connections to transformers . . . underground

TYPE KMLD Stud Mole, insulated with oil resistant Neoprene, provides the simplest, quickest means for making secondary connections at the transformer itself, eliminating many joints and junction boxes. Cables are quickly connected to the Stud Mole merely by inserting ends into outlets, and tightening socket head pressure screws. Phenolic insulating plugs cover the screws. The joint is completely sealed by tightening the non-corrosive clamps around the outlet insulation. NO TAPING NEEDED. Clamping plates seal KMLD to transformer housing without need for porcelain bushings. Each outlet accommodates the rubber insulation on all conductors up to 4/0, through use of bushings for smaller cable sizes. Type KMLD may be installed by the transformer manufacturer or by purchaser after consulting the manufacturer.

Bulletin 48Z1 gives full details on KMLD, as well as on Type KME Mole for low capacity use in light load areas. Ask your Burndy representative, or write direct for your copy.

Connect with
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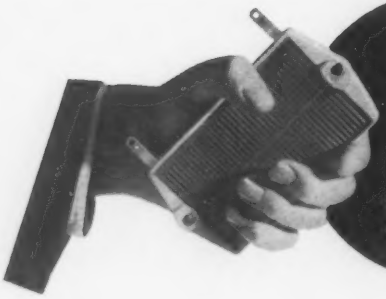
FOREIGN: Philips Export Corp., New York 17, N. Y.



Hand-size 50-ohm NICHROME* Resistor Shrugs Off 35,000-WATT WALLOPS!

This small Ward Leonard Plaque Resister, used in telephone carrier circuits operating through rural power lines, is actually able to carry 35,000 watts!

Such a resistor is employed to by-pass telephone carrier current past the solenoid of a circuit breaker. If a "short" occurs, the resistor must be momentarily able to carry amperage far in excess of its normal rating and tolerate a voltage increase producing up to 35,000 watts, because mechanical lag prevents the circuit breaker from operating instantly. The same applies when lightning, or accumulated static charges, discharge to the ground. Tremendous strain is imposed upon the winding of the resistor during the instant of high current impact, yet it must stand up.

To assure maximum performance, Ward Leonard uses windings of Nichrome V, the superlative Driver-Harris alloy that can sustain tremendous voltage surges without loss of characteristics, retain its superb stability in spite of severe thermal shock.

Whatever your electrical resistance problems, send your specifications to us. We manufacture and draw the most complete line of electrical resistance alloys in the world.

Driver-Harris Company

Stocked for the Coast Trade at: ANGUS-CAMPBELL, INC.
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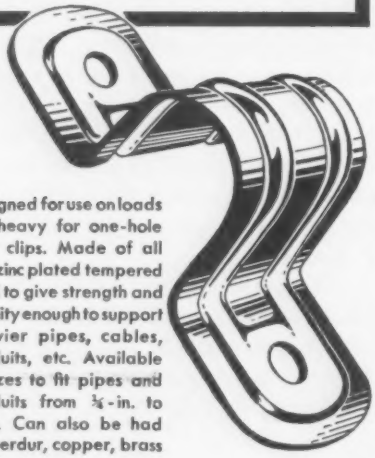
Main Office and Plant: HARRISON, NEW JERSEY

*T. M. Reg. U.S. Pat. Off.

MINERALLAC 2-HOLE PIPE STRAPS For Heavier Loads!



Designed for use on loads too heavy for one-hole Jiffy clips. Made of all new zinc plated tempered steel to give strength and rigidity enough to support heavier pipes, cables, conduits, etc. Available in sizes to fit pipes and conduits from ⅜-in. to 1-in. Can also be had in Everdur, copper, brass or aluminum.

Send for literature and prices

Specify MINERALLAC HANGERS, CLIPS, STRAPS, BUSHINGS

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23 N. Peoria St., Chicago 7, Illinois

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H. H. Van Luven

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Neon—Signal—Control and Power Transformers.

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TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

BURKE ELECTRIC COMPANY
Bakelite Controlead Terminal Blocks

Street Luminaire (1227)

G-E has designed a luminaire to distribute light from large mercury and incandescent lamps with a minimum of glare. This Form 109 is available in a variety of mountings, including the slip fitter type in 1¼- and 2-in. sizes. It will accommodate the G-E 16,000-lumen Type FH-1 and 21,000-lumen Type EH-1 mercury lamps in a horizontal position or the 7- and 9½-in. light center filament lamps. Glare on the street and driver approach sides has been reduced by low-angle shielding of the light source and by an optical system that distributes light to the roadway.

Slimline Unit (1228)

Mitchell has added a two 40-watt slimline unit. This fixture is made up of two 4-ft. sections that slide together to form a single 8-ft. line of light. Sections slide onto individual mounting tracks and are fastened together by nuts and bolts. Installation is a one-man job, according to the manufacturer. The company's trunk lock hinge louver unit hooks onto the basic 4-light fixture and swings open and shut for maintenance. The louver is all metal and designed for effective shielding. Sides are constructed to give the effect of translucent glass.

School Lighting Unit (1229)

Mitchell Model 3031 school lighting unit is an all-metal unit, with smooth design of vertical surfaces on louver, sides and ends to facilitate maintenance. This fixture has a special locking and hanging principle that allows the louver to slide down into an open position on two slotted hangers for maintenance. Louver may be completely removed when desired. May be flush or suspension mounted, individually or in continuous rows. Finished in baked white enamel with satin aluminum decorative end pieces. Uses latest E. T. L.-approved brick-type ballasts. U. L. approved.

F Lamp Capacitor (1230)

Cornell-Dubilier has developed a fluorescent lamp capacitor, Type KX-103, for use in cold cathode fluorescent lamp equipment. Three capacitor elements are combined in a single compact case, rectangular in shape and 2⅛ x 2 13/16 x 2¾ in. in size. Other features include: molded plastic cup-shaped terminal insulators that provide extra long creepage to the case; permanent hermetic seal assured by the drawn type of container with its reinforced seam cover; dykanol impregnation and fill, kraft paper dielectric. Its specifications are: .006-.006 MFD 750 V.A.C., plus 0.51 MF 1050 V.A.C. The same type is available in other capacity combinations, single or multiple units, at voltage up to 1,200 V.A.C., in the same style of case

The Trend Is Toward

CRESCENT SYNTHOL

TYPE TW

●

ONE GENERAL PURPOSE WIRE AT LOWEST COST
APPROVED FOR DRY, WET AND OILY LOCATIONS

●

CRESCENT SYNTHOL Building Wires and Cables are insulated with a special, tough, thermoplastic compound that results in wires of unexcelled Permanence, Safety, Adaptability and Value. They combine high dielectric and mechanical strength with the following desirable features.

RESISTANT to moisture, acids, alkali and most chemical solvents.

OILPROOF — cutting oils, greases and petroleum lubricants do not injure SYNTHOL.

SMALL DIAMETER — has smallest outside diameter for same conductor size, permitting more conductors, or larger conductors in same space.

FLAME-RETARDING — SYNTHOL insulation will not support combustion.

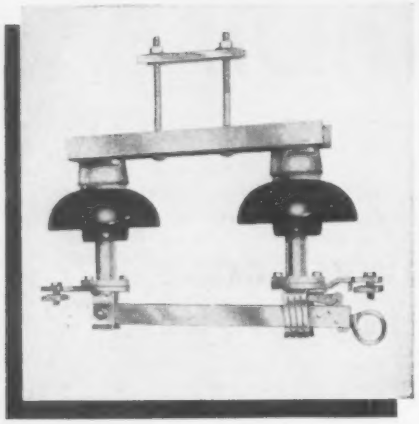
BRIGHT COLORS — non-fading, the insulation is the same color throughout so color will not scrape off; easily cleaned; twelve colors.

FREE STRIPPING — makes splicing and soldering easier and faster.

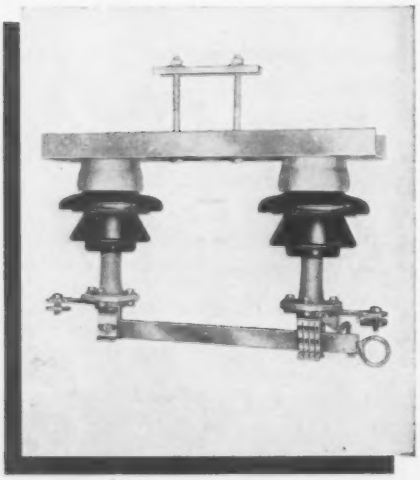
EASY PULLING — because SYNTHOL wires have a permanent clear wax lubrication on their hard, smooth, abrasion-resistant surface.

CRESCENT
WIRE & CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

MATTHEWS DISCONNECTING SWITCHES



Available in ratings of 7.5, 15 and 23 KV., 200 and 400 amperes. These hook operated switches are well constructed and have large blades and positive contacts which prevents any overheating at full rated load. All 200 ampere rated switches are furnished with single blades while the 400 ampere switches have double blades and can be supplied with or without blade latches. They are adaptable for horizontal or vertical mounting and can also be supplied with NEMA rated insulators as shown below.



Write for Bulletin 106

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

BULLETINS ETC.

Motors (1231)

Motors of 1 hp. or larger for driving power house auxiliaries are described in a 28-page illustrated bulletin from Allis-Chalmers. This bulletin gives data on types and characteristics of the manufacturer's induction motors, construction details of standard open-type motors, special features for open-type motors and totally enclosed fan-cooled motors. A motor selection chart is included.

Transformer Base (1232)

Pennsylvania Transformer Co. is offering Bulletin 1648 on its new base for single and 3-phase transformers, 167 kva. and larger. Illustrated.

Insulators (1233)

A new suspension insulator bulletin and catalog section has been published by Locke Inc. It illustrates and gives specifications for all NEMA standard suspension insulators. Also listed are insulators for use on lightly loaded lines, extra-heavy porcelain shell insulators and the new, self-cleaning "fog type" insulators.

Distribution Box (1234)

Ohio Brass has issued a 4-page folder on its Type-KG permissible distribution box, 250 and 550 volts d-c.

Connectors (1235)

Condensed Catalog C-47 on Cannon connectors supersedes C-46-A and C-46.

Oil Circuit Breaker (1236)

Pacific Electric Mfg. Corp.'s 69-kv. frame-mounted oil circuit breaker of medium capacity for transmisssion or distribution service is described in a recent bulletin. Type JE-42E/600 amp., 1,000,000 interrupting kva. (NEMA); Type JE-42F/1,200 amp., 1,500,000 interrupting kva. (NEMA); 8 cycle opening; 20 cycle reclosing.

Equipment Catalogs (1237)

Reliable Electric Co. has issued a series of five catalogs covering its complete line of solderless connectors, straightline splices and deadends, splicing sleeves, cable specialties and telephone protective and terminal equipment.

Industrial Lamps (1238)

A bulletin covering lamps for heavy-duty industrial service has been issued by Radiant Lamp Corp. Described are floodlights for indoor and outdoor use, infrared lamps for industrial drying service, splatterproof, weatherproof and standard lamps.

Connectors (1239)

American Phenolic Corp. has a new 76-page catalog of connectors for power, signal and control circuits in aircraft and electronic equipment.

Studio Lights (1240)

"Klieglights for Television"—Bulletin 53, published by Kliegel Bros., shows methods and equipment used in lighting television studios. It includes a typical layout for lighting television sets, information on the various types of units developed for the purpose, data on essential wiring devices to provide flexibility and control.

Recorder (1241)

The Ampex magnetic tape recorder is described in a recent bulletin.

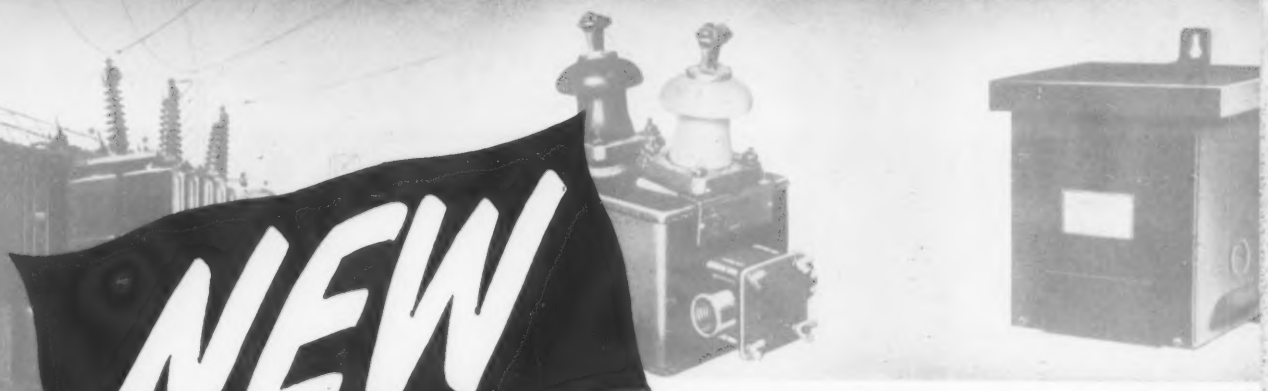
ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

1200	1201	1202	1203	1204	1205	1206	1207
1208	1209	1210	1211	1212	1213	1214	1215
1216	1217	1218	1219	1220	1221	1222	1223
1224	1225	1226	1227	1228	1229	1230	1231
1232	1233	1234	1235	1236	1237	1238	1239
1240	1241						

Name..... Company*..... Title*.....

Address .....

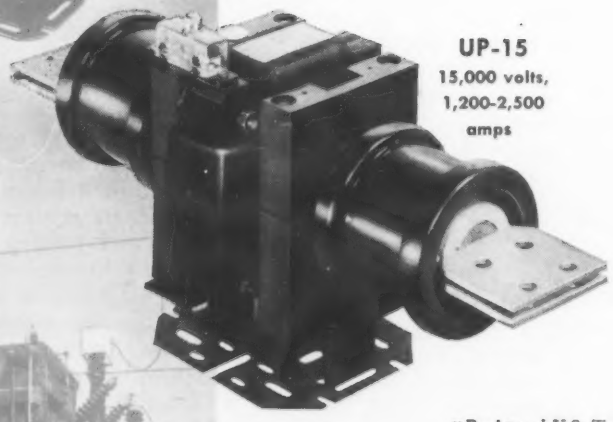
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



NEW

TWO NEW CURRENT TRANSFORMERS
for dependable accuracy at high and low ratings

CT-2.5
2,890/5,000Y volts,
10-800 amps



UP-15
15,000 volts,
1,200-2,500 amps

TYPE CT-2.5

This new addition to the well-known Westinghouse CT line of instrument transformers is designed for low voltages. It provides high accuracy and 45-kv impulse strength for metering and relaying applications.

TYPE UP-15

The new UP-15 provides exacting accuracy for metering and relaying applications at higher ratings. Wet process porcelain insulation surrounding the heavy, bar-type primary guarantees a more consistent margin of strength.

Westinghouse indoor current transformers, the most complete line in the industry, are backed by the type of research and development that assure top-quality performance. For complete information, write your nearby Westinghouse office or Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-70520

CHECK THESE OUTSTANDING FEATURES:

- 0.3 class accuracy for burdens B-0.1 through B-0.5.
- Hipersil* core steel for light weight, small size and greater metering and relaying accuracy.
- Transparent terminal blocks to place secondary connections within easy observation.
- Automatic short-circuiting devices to protect personnel from induced high open-circuit voltages.
- EEI-NEMA standard mounting dimensions.

*Registered U.S. Trademark

WESTINGHOUSE

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

YOU CAN BE SURE IF IT'S Westinghouse

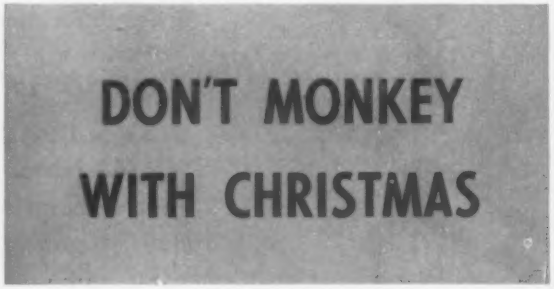
ELECTRA'S HUSBAND

DENVER'S "charge of the light brigade" on the Christmas illumination front has been settled without bloodshed—but there have been casualties: The art school of electrical painting for Yule purposes was unhorsed and the "old guard"—whose thinking is in terms of bright colors, exciting incandescent themes and a world of power load—is again in the saddle, after last year's illuminating experience.

Mayor J. Quigg Newton imported from the East a highly competent lighting engineer (whose background and reputation were impeccable) to design and execute Denver's 1947 Christmas Civic Center illumination program. There was a nonpareil publicity buildup marking progress of the installation. A sneak prevue Dec. 21 yielded pale but artistic newspaper photos of the end product. Johnny Malpiede, city electrician, who had been bypassed in the arrangements said nothing — eloquently and officially. Just prior to the flash-on, however, he told Mayor Newton privately: "This is going to be different," with the modest understatement for which he is famed.

By way of historical anecdote, Malpiede is the electrical genius who, prior to war brownouts and blackouts, contributed measurably to Denver's reputation as "Christmas City of the World." In 1946, when Denver's citizens were hungry for the "feast of lights" they had formerly enjoyed, Johnny plumbed hidden recesses of city warehouses for electrical equipment and drew forth amazing treasures (none of them new because none was obtainable). He laid on colors with a heavy hand—reds and greens, in particular. He presented Santa Claus, Red Riding Hood. He used everything but the kitchen sink, and would have included *that*, if it had had an electric dishwasher with suitable stop and go lights. The city was delirious with delight; especially the kids. Persons classified as "fuddyduddies" moaned that the display surrounding the Municipal Building was "garish" and "exhibitionistic," also "wasteful."

That was 1946. December 1947 was, true to Malpiede's prediction, "different." The first public showing brought little reaction from the public. Automobiles massed on the State Capitol heights, above Civic Center, where the view was best. By Christmas night, sightseeing traffic had fallen off. Citizens began to sound off in the press. Educated and artistic souls were enchanted by delicate treatment of the "Nativity" in pale colors, with concealed lighting behind City and County Building colonnades; other taxpayers, less impressed, wrote letters to the editor characterizing the show as "lousy" and "stinko."



Neither big daily newspaper immediately took sides. Finally, Lee Casey, columnist for the *Rocky Mountain News*, definitely allied himself with the "arty" phalange. Then came the deluge. Outraged citizens who usually like or dislike something and let it go at that, took pen in hand and expressed themselves, vitriolically, caustically and almost hysterically in violent protest. The *News*—give credit to skijoring, mountain-minded Editor Jack Foster—gave pages of space to the criticisms.

Mayor Newton, after a thoughtful interval, announced that John Malpiede definitely would be put in charge of the city's lighting program to greet National Western Livestock, Horseshow and Rodeo visitors Jan. 16-24, for whom the holiday lights are traditionally left burning. Bearing in mind one letter to the *News* that seemed to epitomize public sentiment, he set to work.

The communication by which John Malpiede was guided reads thus:

"The spirit of Christmas is one of our most refined celebrations, but as long as we do celebrate it out in public with lights and tinsel, let's do it in a light, bright way.

"Let John Malpiede drag out all the stuff in the storeroom and send the expert back home . . .

". . . We have bragged to our relatives about our Civic Center. Did we lose face when we took them to see it!

"So let's celebrate the birth of Christ in a fitting way in our hearts and homes, but really be bright, gay and colorful in Civic Center." It was signed by "The Blue Family" giving an address on Green Court.

Payoff on the whole controversy was an announcement that the artistic holiday Denver lighting of 1947 cost about three times the 1946 job.

Bookies in Denver, who will make odds on anything debatable, offered odds that Johnny Malpiede would call signals for charge of the "light brigade" in the 1948 Christmas incandescent show. And he did.

ELECTRA has complained for a long time about low voltage, especially around meal time. However, she changed her tune after I told her about a certain power company president who really was bothered by low voltage.

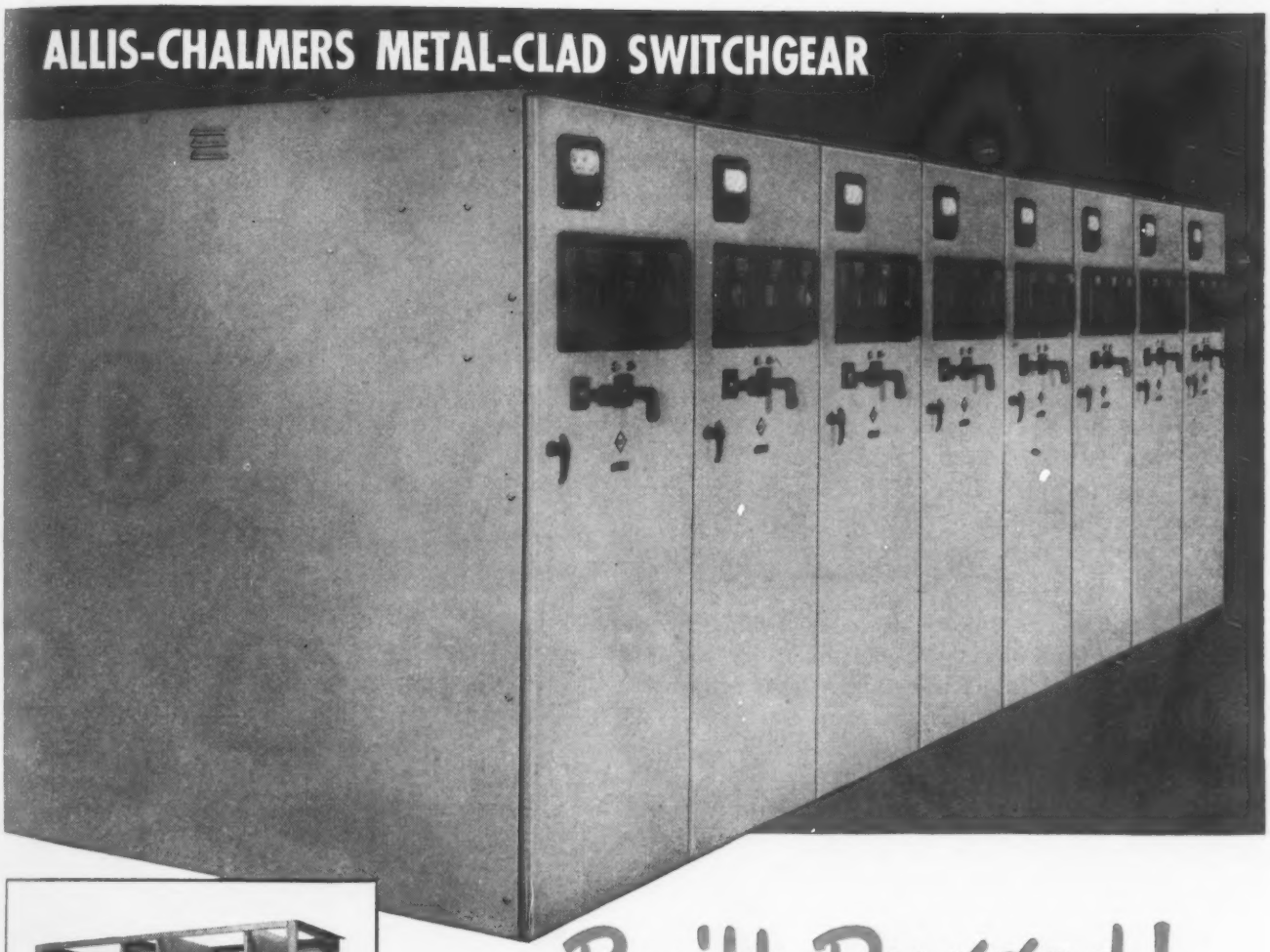
This president suspected that voltage at his house was bad. He had good reason for it. The automatic toaster operated on a three-cycle basis — a warm-up run and then two runs to turn out pale and rubbery toast. The kitchen ventilating fan hummed a tired song but didn't turn a lick when the switch was pulled. By arising at 6:30 in the morning and turning on the range elements, he had the stove hot enough to cook his breakfast at 8.

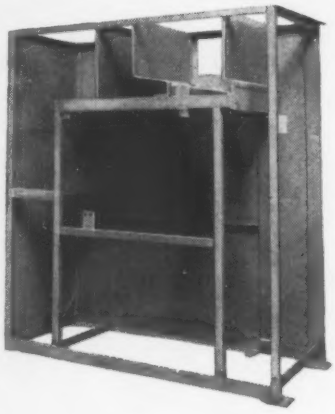
He had the operating department hang a recording voltmeter on his service to confirm his suspicions. After he read the chart for a couple of days, he asked the superintendent of operations what constituted poor voltage. He was told an 8- or 9-volt drop. The low point on his chart was 25 volts below normal! Only between 2:30 and 4:00 a.m. did the chart register 120 volts.

But who wants to get up in the middle of the night to cook? Certainly not a power company president!

P.S. — His company now has an energetic and well-conceived distribution improvement program.

ALLIS-CHALMERS METAL-CLAD SWITCHGEAR





THIS STRONG FRAMEWORK really *protects* switchgear . . . heavy steel plates and angles are reinforced throughout.

Built Rugged!

A-C SWITCHGEAR HAS RIGID, SELF-SUPPORTING STRUCTURE—REQUIRES ONLY FOUR POINT ALIGNMENT!

A RECENT SURVEY showed that engineers were most impressed with the rugged construction of A-C switchgear. Here's why: the framework of steel angles and formed plates is reinforced to make a self-supporting structure; joints are lap welded for extra strength, structures are assembled on two full length channels for simple, four point support.

This kind of sound engineering is reflected throughout all A-C switchgear . . . that's why it is *preferred* by operating men and engineers alike.

ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2502

Ruptair, Ruptor are Allis-Chalmers trademarks.

HERE ARE 5 OTHER PREFERRED FEATURES:

HORIZONTAL ARC INTERRUPTION . . . *Ruptair* magnetic air circuit breakers eliminate need for "puffers" . . . natural thermal effect assists arc into the arc chute. Especially effective at low currents when magnetic effect is weak.

A-C DESIGNED arcing contacts of high melting point alloys minimize burning, assure low maintenance, long life under repetitive duty.

CONTACT FINGERS on removable element permits easy inspection without de-energizing main bus.

PREDICTABLE low installation costs . . . unit is "packaged," ready for connection. Detailed drawings provided for each installation.

ADEQUATE BUS INSULATION . . . no-corona tape, bakelized paper tubing, insulating tape eliminate compound-filled joints. Easily installed in field and removed for installation changes.

A-C builds these circuit breakers: Air Blast, *Ruptair* magnetic, *Ruptor* oil, Low Voltage air.

ALLIS-CHALMERS

First in the U. S. with Metal-Clad Switchgear

Assembling Core and Coils

ANOTHER IMPORTANT PHASE IN THE MANUFACTURE OF

No other phase in the actual fabrication of a transformer is more important than the work of assembling the coils into complete windings, and installing them on the cores. Carelessness on the part of the workmen, or inexperience, may result in costly damage to the winding insulation. Consequently, only the most reliable and experienced men are used for this type of work.

The care which Moloney exercises in connection with every detail of design and manufacture is your assurance of obtaining transformers that will provide real *on-the-job* performance.

1 Windings consisting of individual disc coils, are assembled on forms as shown above. Pressboard spacers separate the coils and form radial oil ducts which permit free flow of oil for uniform cooling. Extra spacers are used to spread portions opposite tap sections in the other windings to reduce cross-flux and provide more uniform impedance on the various tap connections.

4 After the core legs and the bottom head of cross-irons have been assembled, the windings are placed into position. Usually the lowest voltage winding is placed next to the core. The above photo shows the intermediate voltage winding of a three-winding transformer being placed over the low voltage winding. The latter had previously been covered with an insulating cylinder.

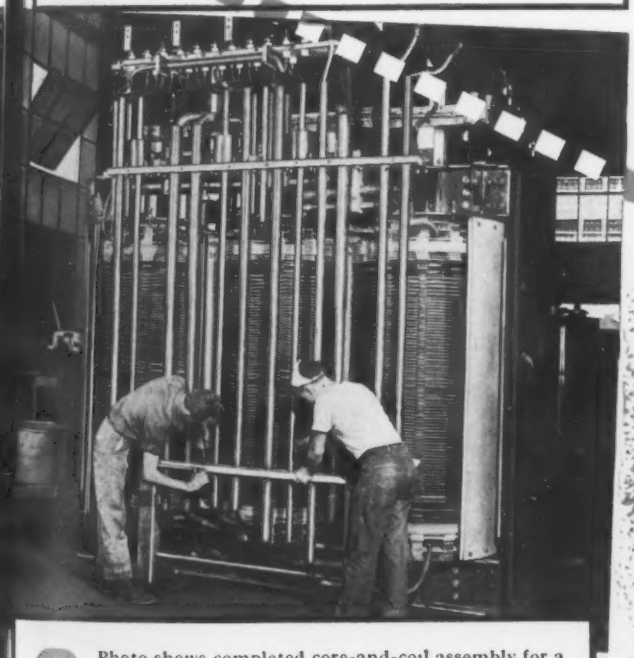
5 After the windings have been placed on the core legs, the top head of cross-irons is installed. Next, the top core clamping structure and the steel end plates are bolted into place. This makes a mechanically strong unit of the core-and-coil assembly. Note in photo that radial spacers are provided at top and bottom of coil stacks to permit flow of oil to the vertical oil ducts between the core and the low voltage winding.

MOLONEY

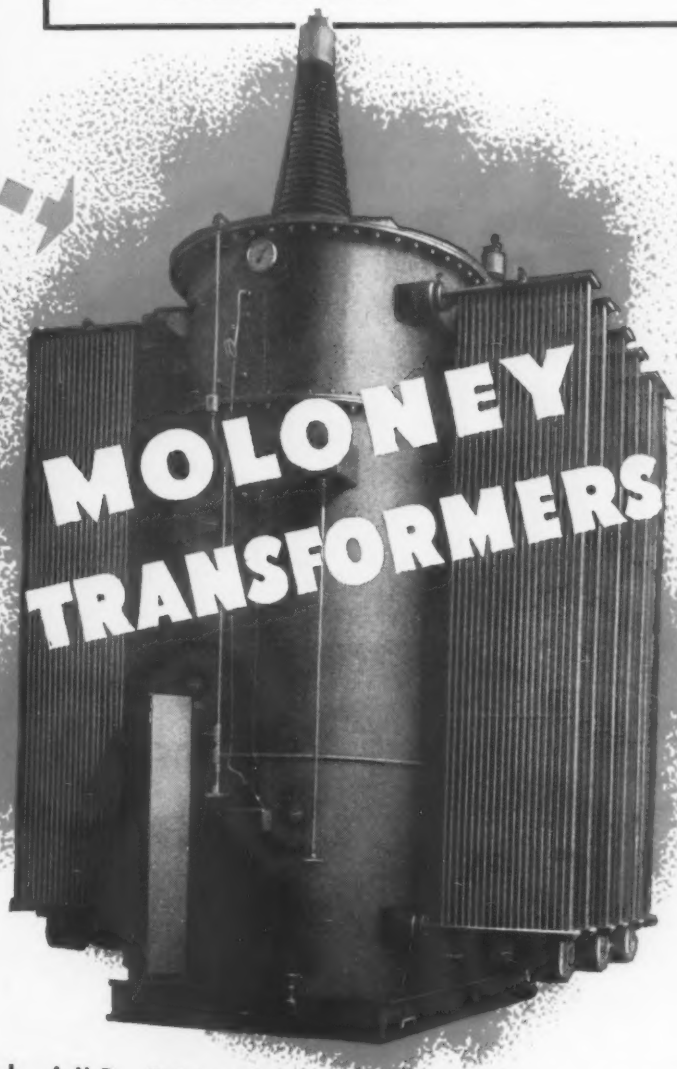
POWER AND DISTRIBUTION TRANSFORMERS EXCLUSIVELY SINCE 1896

2 Pressboard spacers separate the individual disc coils and are fastened to the spacer bars which provide the vertical oil ducts between windings. This permits accurate alignment, providing mechanical strength to withstand the forces encountered under short circuit conditions. Connections between coils are gun-brazed as shown in the photo, and then thoroughly insulated.

3 Following assembly of the stack of disc coils into a continuous winding, it is compressed to the proper vertical dimension, securely clamped, then subjected to a series of drying, varnish impregnating and baking operations. These serve to (1) remove moisture from the insulating materials, (2) seal the windings against moisture, (3) provide mechanical strength for ease of handling when installing the winding on the core.



6 Photo shows completed core-and-coil assembly for a small three-phase power transformer, ready for preliminary testing. Leads are anchored firmly by means of insulating tubing. Lead connections have been carefully brazed and insulated. Insulating shields have been placed between phases and between the end plates and the windings.



MOLONEY TRANSFORMERS

ELECTRIC COMPANY

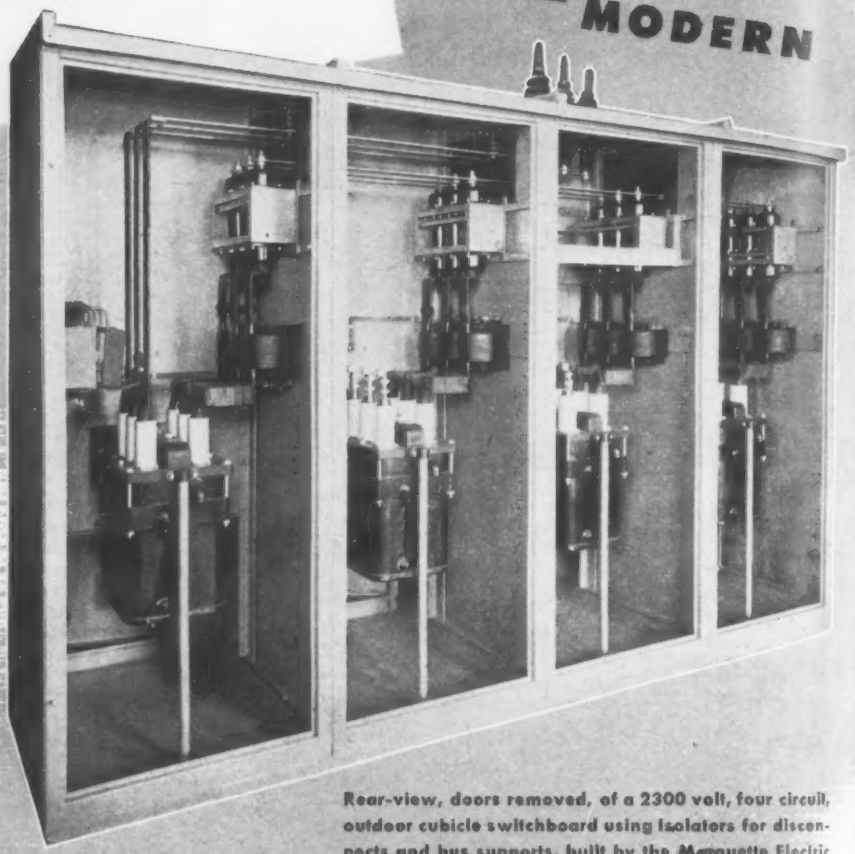
FACTORIES AT ST. LOUIS, MISSOURI AND TORONTO, ONTARIO, CANADA

ISOLATORS ARE SAFE RELIABLE EFFICIENT MODERN

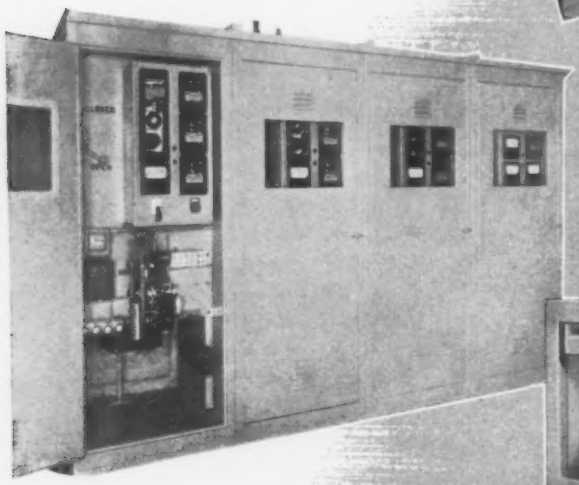
Almost every branch of the power industry uses Isolators to good advantage.

Illustrated, herewith, is a four position, outdoor cubicle switchboard, Isolator equipped and with automatic reclosing gear. Its builder achieved a number of desirable results by using Isolators, such as savings in material and labor and assuring safety to operators. The ultimate user gets a neat, compact and up-to-date switchboard.

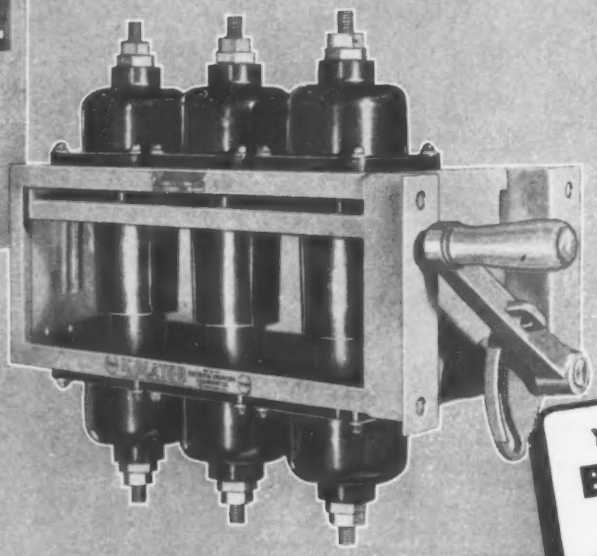
Whether your job is a cubicle switchboard, a vault, switching center or any high voltage structure generally, you can do it better with an Isolator.



Rear-view, doors removed, of a 2300 volt, four circuit, outdoor cubicle switchboard using Isolators for disconnects and bus supports, built by the Marquette Electric Switchboard Co., Chicago, for a major independent oil company.



Front-view of same switchboard showing Isolator control in one cubicle.



A three pole, single throw, 400 ampere, 5 KV Isolator.

YOU CAN DO IT BETTER WITH AN ISOLATOR

It will pay you to get acquainted with the Isolator. Ask for Bulletin 135

THREE ELECTRICAL ENGINEERS EQUIPMENT CO. MELROSE PARK, ILL. U.S.A. THE MARK OF QUALITY

ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

DECEMBER, 1948 Vol 101, No. 6

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

RELEASING HUMAN POTENTIAL THROUGH LEADERSHIP

A. Martin*

General Electric Co., Oakland

MARVELOUS progress has been made here in the century since our forefathers came in search of gold and stayed to found an empire —the potential of which is just now becoming generally recognized. Those hardy men did their founding work literally with their bare hands and against great odds. They summoned forth and used that vast reserve of power that is characteristic of man. I wonder if we of this generation would be equal to such a challenge? Or more truly, I wonder if we are equal to a greater challenge, for we surely are confronted with one. Can we release and direct the human power of this generation which can carry us on to even more freedom and greater things, or will we fall victims of coercion and the creeping paralysis of collectivism? Will we fritter away our glorious heritage either through ignorant support of or passive acquiescence to the spurious philosphy of something for nothing and the sacrifice of *just a little freedom* for the most viciously false of all promises—collective security. This is the one greatest challenge that confronts us today.

I'm sure that all of us here are aware of and disturbed by the current situation and trend as reflected by industrial strife, race prejudice, class consciousness, political expediency, and multifarious anti-social and uneconomic acts. The question is are we sufficiently disturbed to do something about it? Our society is not just drifting in an unfavorable direction—it is being both led and driven. Whose responsibility is it to do something and now?

"Releasing human potential through leadership." What do we mean by "human potential" and how much is there yet unreleased? What do we mean by "leadership" and how is it to be brought to bear on the problem?

Some of our psychologist friends tell us that the average American adult develops and uses less than one-fourth of his capabilities. Sixty-million productively employed Americans limping along with, on the average, only one of four cylinders firing. In view of the perfectly marvelous accomplishments in America—the envy of the world—can such a statement possibly be true? Obviously, no precise laboratory evaluation can be made, but common sense and sober reflection will tell us that there is a vast margin between what we are as individuals and what we might be. How important is this margin? Is our society so mechanized that human capabilities are of little consequence? Let us take testimony from some who have studied the problem. One prominent surveyist said recently, as a result of a thorough study.

"Nearly all business problems, when sifted down, are human problems. Production problems, distribution problems, financial problems, administration problems, nearly all end up as human problems. Nothing happens in business except through people."

Need he have confined himself to business problems. Are not our social, political, racial, international—in fact all problems—basically human problems? Our surveyist went even further and said that the human assets of business were at least 85% of the total assets: 85% men, 10% materials and 5% money. A famous railroad man once said that railroading was 95% men and 5% iron. Such testimony can be extended but I'm sure you agree that human power—mental, physical and moral—is the greatest asset we have and yet it is effective to the extent of possibly only one quarter of its potential. There lies about us then a vast resource to be developed for the mutual benefit of all mankind.

Certainly our founding fathers from the landings at Plymouth on through the '49ers released and used more than one-quarter of their capabilities. Why then have we apparently lost the secret to or incentive for comparable performance? This problem was being discussed in a meeting of foremen at our plant recently and exactly the same question came up. One foreman suggested that our pioneers were confronted by immediate and personal peril and the consequent stark necessity of making the best of what they had or perish. Another suggested that, as we have prospered, we have softened in moral fiber. Another suggested that, as we have become industrialized, and specialized, and mutually dependent, the correlation between performance and success or even survival has become obscure. And still another suggested that industrialization and mechanization has stifled pride of workmanship. And another suggested that many Americans have been misled, misinformed, and in short, duped by demagogs and charlatans for political and other purposes. The discussion went on for more than an hour developing other points and variations of points. I believe we approached the answer to the question of why we today do not seem to be making the most of what we have. It was further agreed that the most fertile field in which we could possibly work was toward finding the key to and releasing at least some of

* From an address before the Pacific Coast Electrical Assn., at Fresno, Calif., on Oct. 28, 1948.

the latent human resources under our supervision. The problem is how?

The subject of this talk maybe indicates one direction toward the solution of the problem of how we might release some of the latent human potential. Leadership is an art difficult to define, let alone master and use. And it is that one indispensable ingredient in successful, cooperative enterprise. It is that magic catalytic agent in cooperative human endeavor that releases and brings forth into concerted action those latent constructive group capabilities that we so desperately need. Unfortunately, also the same art—leadership — when effectively practiced by the unscrupulous and viciously ambitious leader, can release and bring forth to action the destructive capabilities of mankind. Examples of this latter situation are painfully evident throughout the world and to a lesser but alarming extent right in our own U.S.A. It seems that people will be and probably must be led. We in positions of responsibility in free enterprise industry had better give more attention and effort to this phase of our job or one of these fine days we may look back longingly at an opportunity irrevocably past.

Essentials of Leadership

Now what are some of the essentials of leadership that you and I can observe, master and use? First, we are talking about a relationship between a man and other men in action or motion. It is a dynamic and not a static thing—it cannot be truly characterized by a list of abstract qualifications possessed by a single individual but maybe only as action and reaction between men. I visualize a leadership situation as composed of three primary elements—the leader with all of his qualifications, weaknesses, ambitions, prejudices, background, etc. The led with all of their qualifications. weaknesses, ambitions, prejudices, background, etc., and the situation that brings them together with all of its tensions and customs, none of which are wholly the creation of either the leader or the led. Then there is the secondary or dynamic element which is the product of the interaction of the three primary elements.

Even though we can not ever know all the answers, there are some few things that we can know from experience, study and observation. If we are a leader, we must be going somewhere and must have a following. There is no such thing as a leader without followers and mere appointment as boss does not give us that following. Executives and bosses are appointed by their superiors but leaders are elected by their followers. Election need not be by formal ballot, it is manifested by group attitude. It is, of course, ideal when an individual has the confidence and support of both those to *whom* he is responsible and those *for whom* he is responsible.

Let us look briefly at each of the three primary and the one secondary elements enumerated a moment ago. The group that we wish to lead are just ordinary—average good Americans—not different basically from you and me. What makes an ordinary man tick? What stimulates him to action or lulls him into inaction? In short, what are the facets of human nature that have a bearing upon our problem of releasing human potential through leadership? Human nature has not changed basically since the dawn of recorded history and is not likely to change in our lifetime, therefore, we can search history, literature and psychology for our answers.

Man is selfish, i.e., motivated by self-interest. He is inclined to exert himself for what he believes to be in his own interest. He will also try to defend himself against what he believes to be harmful to himself. Irrespective of what the facts are, it is what he believes that motivates him.

Man is proud and somewhat vain—he cherishes the respect and approbation of others. He likes to be and feel and be recognized as important. If what he is and what he does is not recognized appropriately, he is offended and resentful. Think how we all strive for recognition.

Man is social in his instincts, i.e., he dervies satisfaction, complementary strength and a feeling of security from a sense of belonging. He resents ostracism and imposed rigid classification.

Man tends to be mentally lazy, impressionable and subject to emotional influence. This makes him easy prey for the emotionally charged and factually warped propaganda of the demagog.

Two or more men associated in harmony have a combined productive or creative capacity that is greater than the sum of their individual capacities. Also two or more men associated in conflict have a combined capacity that is less than the sum of their individual capacities.

All history tells us that the majority of men want to be led, can be led and will be led, either to greater freedom and better things or to the paralyzing rigidities of regimentation from which there is no easy return.

A man has wants—hungers, both material and spiritual. If he can reasonably satisfy those wants he is happy and confident, progressive, constructive and cooperative. If he cannot, or thinks he cannot, reasonably satisfy those wants, he is frustrated and resentful of the system in which he works and lives. He is grist for the mill of those who thrive on discontent, chaos and hate. His creative potential is stifled and his destructive potential is encouraged.

Man can and will face up to the facts and realities of a situation if he understands what those facts are. He has a well-developed sense of fair play and asks no odds if he feels that no one else has or can take unfair advantage of him. On the other hand, if he does not have the facts of the situation or has been deliberately misinformed and he feels or can be led to feel that he is being victimized, he will be resentful and, under encouragement, destructive.

If we accept these characteristics as typical of the nature of the employees in our organizations, and if we further recognize that men can be effectively led but not driven or coerced. then we see clearly at least a part of our job.

What Must a Leader Be?

Now let us look briefly at the leader —what must he have and what must he be and do? This is a most difficult question to answer specifically but we can generalize.

1. A leader must have something his followers want and can use. He must be able to and must help his people to know what they want to do and then help them to do it.

2. A leader must have the common touch and must demonstrate that he understands, appreciates and sympathizes with the aims and ambitions of his group.

3. He must prove that the group can do more for themselves under his leadership than they can alone or under some other leader.

4. He must be honest, enthusiastic and have courage — courage of his convictions and courage to make decisions.

5. Above all, he must be able to persuade because his job is to get things done which means he must get people to work. The only effective method he has at his disposal is persuasion.

You can add many other characteristics that are evident in successful leaders.

Now what about the situation, and particularly the industrial situation, that we must work in? We are brought together in a rather unnatural, and to some extent in the beginning, an involuntary association—each with his own capabilities, background and desires. There are laws,

policies, company regulation, union regulations, customs, cliques, the formal organization and the informal organization—all to be adjusted to. There is the accumulated history of the employee-employer relations at the particular plant and industry in total. Then there is the job itself—the importance or meaning of which in the whole scheme of things is often obscure. There are the opportunities and insecurities inherent in a free economy. At best, here is a rather complex situation.

Employee Program

The interaction of these three elements, the employees, the boss and the conditions of their association, can produce a variety of results. The real key to the whole thing is how effective is the boss in grasping and directing all of the complicated forces and influences under his supervision. If he is the leader of the group, he can release, combine and direct the capacities of his people. If he is not their leader, then much of the human capabilities are never released. In the proper atmosphere, which is largely the product of the leader, members of the group complement each other and draw inspiration from each other and from the leader.

I wish I had a simple formula to give you that you could apply generally and get right answers. I have none and I suspect no one else has one. We are all trying to find a better and better solution. Obviously, the answer lies in the direction of more study, experimentation, training of supervisors and general education of the rank and file. Simply recognizing the problem and the tremendous possibilities to be realized is a significent step in itself.

Since I cannot give you a formula, possibly you may get an idea or some encouragement from a brief outline of how we in General Electric have analyzed this problem and are trying to solve it. At least what we are trying to do has the virtue of being the product of many minds and much serious and searching thought.

We have initiated, and are now pursuing a program designed to constructively influence relations with employees, the communities in which we live and work, and the unions with which we deal. The objectives are three:

1. To have employees come to work regularly, promptly, and in an agreeable — yes, enthusiastic — frame of mind.
2. To have employees willingly exercise their full skill, care and effort while at work, and
3. To have employees go home at day's end with the feeling that they have been dealt with fairly, have been treated with respect and have participated in accomplishing something worthwhile.

In short, our objective is to release human potential through leadership under democracy. Recognizing that an employee's attitude is influenced by the job itself and the associations and conditions surrounding it; by the community, i.e., his neighbors and associations away from work; and by his union which he has joined and delegated to represent him in certain matters with management, we have instituted a three-part program:

1. A job improvement and job-selling program.
2. A community relations program.
3. And a union relations program.

We have found from a little study and common sense observation that an employee who likes his job in all of its aspects is a good employee. If he likes his job it means that he gets certain wants satisfied. What does he want or have a right to expect from a job? Our employees have indicated that they expected certain things.

1. Good pay—that is, proper in relation to other jobs in the shop and community.
2. Good working conditions — that is, as good as they can reasonably be made and a willingness on the part of management to improve them when practicable.
3. Good bosses—that is, supervisors who are competent technically and as leaders, and who are fair and human.
4. Job security—that is, job opportunity to the extent that good management and good workmanship can maintain it.
5. Respectful treatment — that is, recognition for what he is and what he does.
6. Fair promotion—that is, on the basis of merit.
7. Full information—that is, all of the facts about his job, his company, his country and their future.
8. Belief and pride in job—that is, he wants to feel that his job is important and that he is a member of the team.
9. Job satisfaction — that is, he wants the whole job to be satisfying—not just certain particular aspects of it.

We are striving to make every job meet these specifications and then to sell the job in the same way we try to sell our products. We and others have long since learned that it is not sufficient to build a better product but we must sell it constructively and continuously. Our first-line supervisors are the salesmen and they are being trained and helped in every way possible. Leadership rests on salesmanship.

I think the unique idea here is the concept that it is management's responsibility to satisfy the employee with his job rather than the employee's responsibility to satisfy the boss with his work. Reflect on that for a moment. We want the employee's cooperative effort day in and day out just as we want the customer's dollar day in and day out. We go after the customer's dollar by trying to give him what he wants in greater measure than he can get anywhere else. Is it logical to approach an employee on any different basis? A leader is a salesman and a follower is a buyer.

Community Relations

Our community relations program has five objectives. We want:

1. To be a good local business and to be known as such.
2. To be good corporate and individual citizens and to be known as such.
3. To show what we are and what we do as a company—the kind of jobs we have and the significance of our operations to the community and to the nation.
4. To know what the community thinks and why.
5. To sell the American industrial and economic system.

In short we want to merit and have the respect and confidence of our neighbors as such and because of the neighbor's influence on the attitude of our employees.

In our union relations program, our main objective is to be free—free to do what is right for employees, customers, stockholders and the general public. To date, we and our employees have sometimes been coerced into doing what we and they knew was wrong. We would not abolish unions, but through firmness and education of the rank and file, we hope to make unions more constructive and less restrictive. We are trying to help employees to have good unions and we do not define good unions or good union leaders necessarily as those who agree with or go along with us. We feel that any union or union leader is good that strives to advance the best immediate and longtime interest of its members.

We are trying to assume and discharge the responsibility of democratic leadership in the hope that we will be accorded the privileges and rewards of leadership. The method of leadership is persuasion and the effect of leadership is to release and constructively combine and apply human potential for the benefit of ourselves and all mankind.

RISING COSTS AND THEIR EFFECT ON RATE STRUCTURES

Edwin Fleischmann *

Consulting Engineer
San Francisco

EVERYONE nowadays finds that costs are increasing. Costs of living, of transportation, and of the things purchased have all gone up. Costs in the utility business are of varying types, and they have different effects on rate structures, depending upon a variety of factors not always present in the pricing of other commodities and services. The cost of plant influences the fixed and carrying charges on the investment. Higher wages and materials purchased for the operation of the utility make each kilowatt-hour cost more, and they also raise the customer components of rates. Furthermore, rising costs imply that costs now are different from costs at some other time. We are, therefore, speaking of their movement *relative* to costs heretofore experienced; and it is assumed that utilities are chiefly interested in costs now as compared to prewar.

Costs do, of course, affect utility charges to customers. Too often, however, there is an effort to oversimplify the relationship between costs and rates. Care should be taken to guard against this. In a recent decision, the New York State Public Service Commission, speaking of a suggestion for an automatic adjustment of rates, put the matter very well when it said:

". . . one would think that a scientific rate schedule is a thing easily evolved, simply stated, and uniformly agreed upon. Nothing is further from the truth. It is difficult to find two persons thoroughly familiar with rate making who agree upon methods of allocating property and costs, and if this were possible, the question of practical application to existing conditions would still need to be determined. Anyone who would apply to a given company a theoretically perfect rate schedule without regard to the abrupt changes which might be made, would be most fortunate if he escaped the avalanche which might overtake him. If rate making was as simple as extracting a 500th root of a given number, the whole question might be turned over to the mathematicians, but up to this date, organization of any line of activity has not been achieved through the application of the slide rule and the elimination of all judgment."*

Capital Costs

Let us first examine some of the price movements of the past few years, and see how they impinge upon utility operations. All are well aware of the

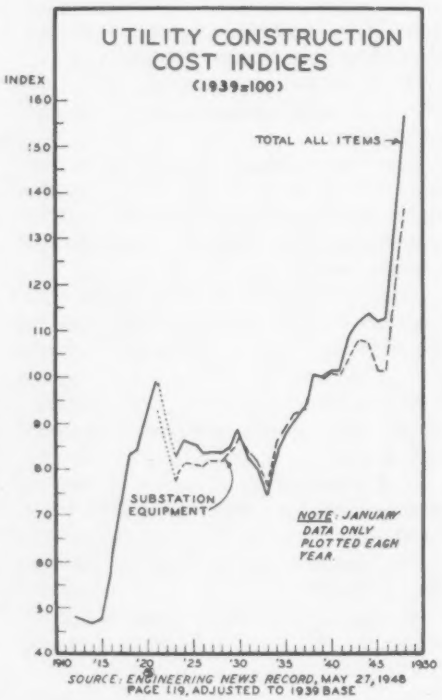


Fig. 1

fact that the cost of new items of plant has gone up. For illustration, Fig. 1 shows what has happened. The solid line is the so-called Handy Index of Public Utility Construction cost. It comprises some fifty items entering into public utility construction. The broken line is an index of the cost of substation equipment, taken from the same source. Both indices have been adjusted to a 1939 base, so that they may be compared today with what we like to think of as "the good old days before the war." Observe that, while prices have gone up more or less continuously since 1933, they rose from a plateau which they attained after the first World War. Notice how they increased from 1914 to 1921. The indices for 1922 are not available; hence the dotted lines on the chart.

The important conclusion to be drawn from these curves is that there has been, it is true, a substantial rise in prices since 1939. Yet, in the period 1921 to 1941, prices also were materially higher than they were before the first World War; but the utility industry operated very successfully in that period, adjusting itself to the changed conditions on the new and comparatively high price level.

There has been an offsetting factor to the rising costs of capital additions. Money has been cheaper in recent years, both for municipalities and for corporate public utilities. This is illustrated in Fig. 2. Here compilations of the yield in per cent per year on utility and municipal securities are shown. The yields, which may be taken as a fair measure of the cost of money to the utility or municipality, are still substantially below the rates in effect prior to the war. Although there has recently been a slight tendency upward, notwithstanding, the costs of money today are still only a little more than half those which prevailed in the depression period. The wide fluctuations in the yield of utility stocks mirror to some extent the variations in the political climate, as well as the intrinsic earning abilities of the companies.

The increased costs of total plant, shown by the solid line in Fig. 1, may be combined with the cost of money, shown in Fig. 2, to derive an index of the interest or dividend component of cost of a newly built unit of plant, financed entirely by municipal bonds. This is shown in the solid line of Fig. 3, public utility corporate bonds indicated by the dashed line, and public utility common stocks, the dotted line.

* Re Consolidated Edison Co. of New York, Inc., Case No. 11639 decided March 25, 1946

* Presented at the annual conference of the California Municipal Utilities Assn., Santa Barbara, Calif., Nov. 17-19, 1948.

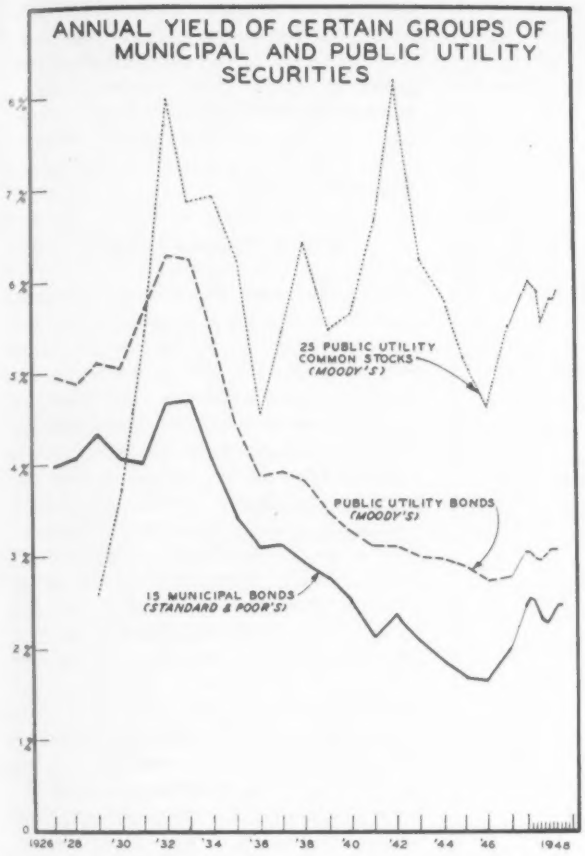

ANNUAL YIELD OF CERTAIN GROUPS OF MUNICIPAL AND PUBLIC UTILITY SECURITIES
25 PUBLIC UTILITY COMMON STOCKS (MOODY'S)
PUBLIC UTILITY BONDS (MOODY'S)
15 MUNICIPAL BONDS (STANDARD & POOR'S)
1926 '28 '30 '32 '34 '36 '38 '40 '42 '44 '46 1948

Fig. 2

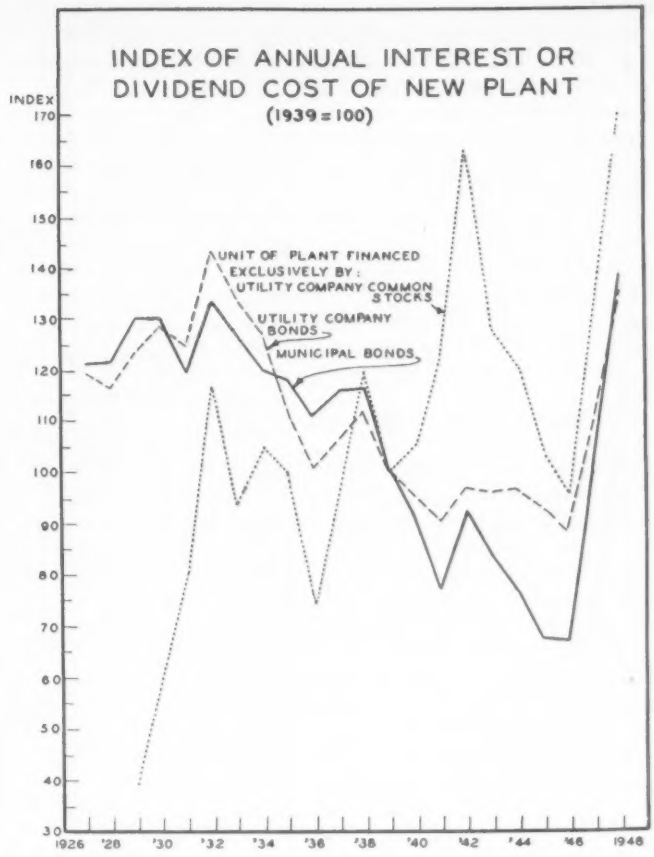

INDEX OF ANNUAL INTEREST OR DIVIDEND COST OF NEW PLANT
(1939 = 100)
INDEX
UNIT OF PLANT FINANCED EXCLUSIVELY BY: UTILITY COMPANY COMMON STOCKS
UTILITY COMPANY BONDS
MUNICIPAL BONDS
1926 '28 '30 '32 '34 '36 '38 '40 '42 '44 '46 1948

Fig. 3

Each point on each curve represents the annual cost of interest or dividend in the year shown, for a unit of plant bought in that year. It will be seen from the chart that these more or less fixed charges are high at the present time, chiefly because of the high price of the plant additions. For municipalities, the index on January 1, 1948, was 39½% above the 1939 figure, and exceeded the 1932 index of 134% slightly. Compare this with the construction cost index of Fig. 1, which is now 56.9% above 1939.

Utilities are concerned with the cost of capital additions. Here in California, because of the 40% increase in population and large industrial development, utility systems have grown by a very substantial percentage of the amount of plant in existence before the war. However, the effect on over-all costs of this sort of expansion is often exaggerated. If, for example, the capacity of a plant be increased by 50%, and the additions cost twice as much per unit as the existing units, the average cost of the whole plant per unit after enlargement is only increased 33%. In other words, even the substantial increases in plant capacity at very high prices, affect the unit cost of total plant quite moderately. Since rates are based on cost of a kilowatt of capacity, this is an important fact. Fig. 4 will give an idea of the way an infiltration of high cost increments works on the average unit cost of plant. Unless the utility is being rebuilt, present-day high costs merely dilute the prewar system unit costs, so that rates, based on over-all averages, need not be as high as might seem to be required. You are still likely, after your expansion is completed, to have

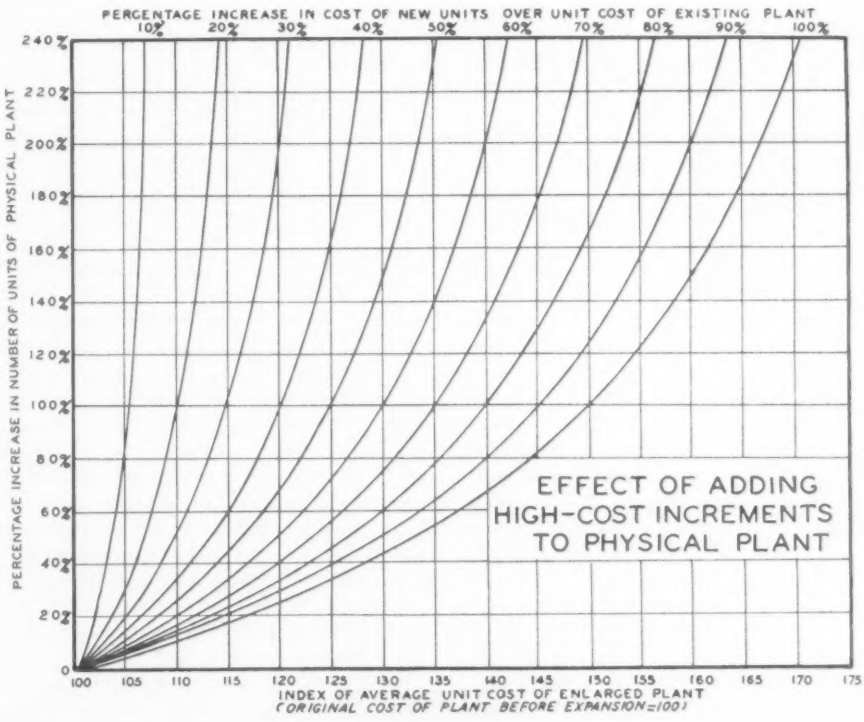

PERCENTAGE INCREASE IN COST OF NEW UNITS OVER UNIT COST OF EXISTING PLANT
10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
PERCENTAGE INCREASE IN NUMBER OF UNITS OF PHYSICAL PLANT
EFFECT OF ADDING HIGH-COST INCREMENTS TO PHYSICAL PLANT
INDEX OF AVERAGE UNIT COST OF ENLARGED PLANT
(ORIGINAL COST OF PLANT BEFORE EXPANSION=100)

Fig. 4

some old, cheaper, and some new, more expensive equipment in service.

It must also be remembered that some of the new apparatus, although called by the same name, and perhaps with the same nameplate rating, is more efficient to operate than the old units. This is a further offset to the higher costs in particular cases. All of these charts tend to show that capital costs and the cost of carrying capital have increased, although the percentage rise above 1939 may not be as high as has sometimes been contended. So much for capital costs.

Wages and Materials Costs

It is unnecessary to emphasize to utility men that wages and the cost of materials used in operating a utility have gone up. The average hourly wages of employees in the electric light and power industry in the United States have risen from 86.9c in 1939 to $1.456 in June 1948, or 67½%. The solid line on Fig. 5 shows this movement. It has been a steady upward one, except for the drop in 1946, due to the decrease in overtime payments after the war. It is now above the high point reached in 1945.

Here again, however, there is an offsetting factor. The United States Department of Labor, Bureau of Labor Statistics, compiles each year an index of output-per-man-hour in various industries. In the electric light and power industry, this index rose to a level 91.1% above 1939 during the year 1944, largely due to wartime stringencies in the available labor market and longer-hour use of electric facilities. The index, which is shown by the dashed line in Fig. 5 was 67% above 1939 last year. Combining these two indices of wages and output will give the derived dotted line at the bottom of the chart, which is an indication of the wage component per kilowatt-hour produced in the United States. In 1947 it was 5½% below the 1939 average. Wages at the moment, therefore, are approximately the same as they were in 1939, per kilowatt-hour. In the case of customer costs, such as meter reading, billing, collecting, and sales promotion, there has not been a corresponding increase in productivity, since those are related to the number of customers served. Utilities have more customers now, but not 67½% more, so that the wage component of these customer costs is probably considerably higher than prewar.

Fuel Costs

In California, a substantial portion of the electricity produced is generated at hydro plants. Fig. 6 shows the percentage of the total produced each year by use of fuel. There are, of course, the important peaks of the dry years 1924, 1931, and 1947. Data for the first seven months of 1948 are indicated by the dotted line. The high percentage in 1947 seems still to be continuing. More and more of the state's electric supply is coming from steam plants. A substantial portion of the growth of the state's load will be in thermal generation. It should be

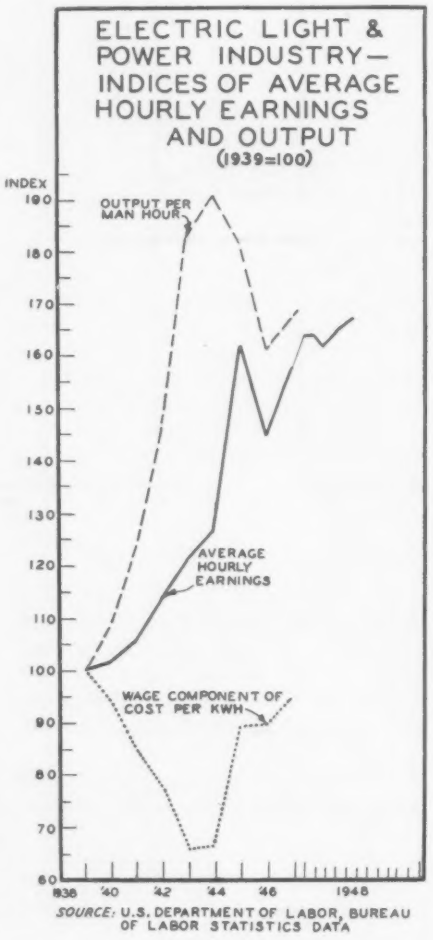


Fig. 5

noted that the peaks, even in the dry years, are growing higher each time.

More fuel will be needed, and that means higher operating expenses. In Fig. 7 is plotted an index of average posted price of fuel oil in tank cars at Richmond, Calif., each year since 1919. The dotted line at the end of the chart shows the index for the first seven months of 1948. On August 3, 1948, a slightly heavier oil was introduced by many of the companies at this price, although some users were unable to handle it and would have to pay approximately 10c per barrel more for a less viscous product.

The cost of natural gas, the only other fuel in general use by utilities in California, is usually geared to the posted price of oil by an escalator provision, so the index may be taken as representative of the movement of fuel prices generally. Fig. 6 and 7 mean more expensive kilowatt-hours from now on, unless both trends reverse themselves promptly; and this is not expected to occur.

Higher Demand Charges

To summarize these data, one may say that the higher capital costs and consequent increases in the carrying charges will call for higher demand charges in rates. Wages and other operating expenses may indicate that the customer components, as well as the kilowatt-hour costs, are exceeding the sales prices. Higher percentage of fuel-generated electricity, and increased fuel costs have a direct bearing on the cost of a kilowatt-hour. In many cases, automatic adjustments in the form of a suitably designed fuel escalator clause have been incorporated in rate schedules. More of this seems indicated in California in the future.

Because rates should reflect the effect of the customer's method of use of electricity, no mention has thus far been made of the higher system load factor most utilities are experiencing. There has been a marked increase in the number of kilowatt-hours produced annually per kilowatt of generating capacity all over the country. It is true that this reduces unit operating costs and fixed charges to some extent. In the same direction is the fact that most systems and areas have found that they can operate on much slimmer margins of spinning and cold reserve capacity than they had thought possible prewar. All of this cannot necessarily be counted as a gain. Longer-hour use of equipment makes scheduled maintenance more difficult, and, if such operation continues too long, the ensuing breakdown may be excessively costly to repair, and it may take a long time to restore the apparatus to service.

Thus far attention has been confined to what has actually happened up to date. What can be done about it?

What Can Be Done?

Opening remarks indicated that there is no automatic inter-relation between costs and rates, no intelligent rate schedule can be formulated, nor can a rate increase be justified without some knowledge of costs of operation and of costs of serving various classes of customers. The very fact just mentioned that there has been an increase in system load factors points up this need. Regulatory bodies feel strongly about this matter, which is likewise of concern to municipalities

when they must justify their own rate schedules. Let us consider a portion of a recent decision:

"Discrimination exists if two customers or classes of customers are charged the same price for different services or different prices for similar services. Therefore, in the determination of rates, consideration should be given to the characteristics and condition of service such as volume, load factor, firm and interruptible service. The most reasonable guide to the rates to be charged is an allocation of the cost of service to the various classes of customers. The characteristics and conditions of service affect the cost of service and must be reflected in the method."*

The absence of cost information is outstanding in the industrial category. Most utilities still cling to the idea that industrial load is essentially off-peak, as compared with the residential lighting load, and have little or no concrete data or inter-customer and inter-class diversity. Cost studies are, therefore, of the greatest importance. Recently, some utilities have emphasized, in their sales efforts, only business which was most profitable to the utility. This, it seems to the author, runs counter to the primary duty of a public service body, which should be to furnish all kinds of service to all its customers at fair prices consistent with the costs of rendering the service. Fundamental economics will then take care of the situation. Nowhere is this more important than in the industrial and commercial categories. A recent writer put this problem very clearly when he said:

"A point to bear in mind is that—aside from terms and conditions of service—the only legitimate control a utility has over the business that may become attached to its lines is an economic one, exercised through the medium of prices. In the industrial power category, if rates are compensatory to the utility and enable the customers to take service at a lower over-all cost to them than any alternative means of meeting their power requirements, then the utility will hold its customers, gain new ones, make money, and there would probably be no question about the propriety of providing more capacity to serve such a load. On the other hand, if industrial power rates are not compensatory to the utility but are advantageous to the customer and the over-all return is adequate, then it follows that some other classes of use are making up the loss on the industrial business. Whatever the facts may be they should be ascertained and made available as guides to managerial and regulatory judgment."*

When there is a need for a rate increase, it is usually possible to simplify the rates and reduce the number of schedules materially. Rare, indeed, is the utility with simple, easily understood schedules or rates, few in number. In most cases, the present schedules, like Topsy, "jest growed." A rate which was originally quite simple, has, through the years, been subjected to pressure by small but vociferous groups, one after another, until it is all cluttered up with verbiage and special conditions, many of them obsolete, or affecting so few customers as to be pointless, if not downright objectionable. Simplification is always desirable, and a needed rate increase

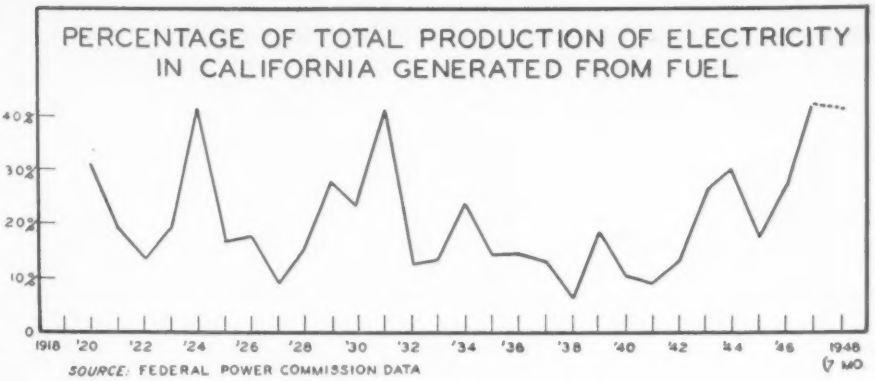

PERCENTAGE OF TOTAL PRODUCTION OF ELECTRICITY
IN CALIFORNIA GENERATED FROM FUEL
40%
30%
20%
10%
0
1918 '20 '22 '24 '26 '28 '30 '32 '34 '36 '38 '40 '42 '44 '46 1948 (7 MO.)
SOURCE: FEDERAL POWER COMMISSION DATA

Fig. 6

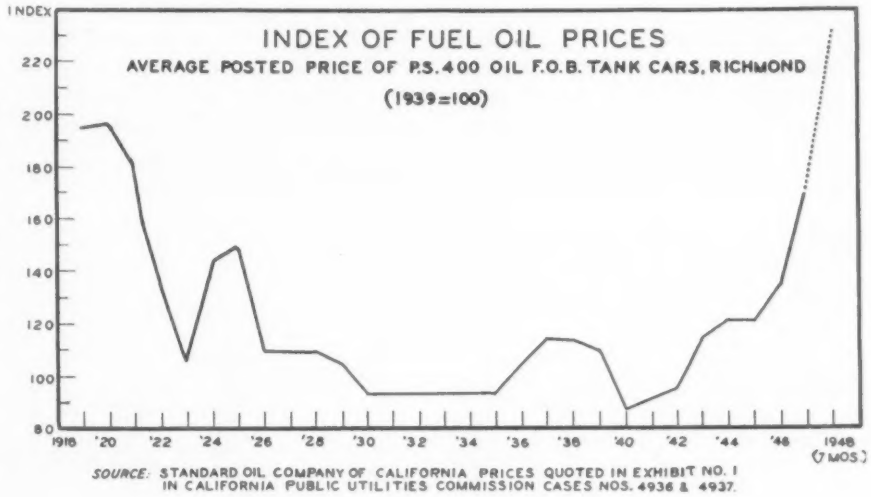

INDEX
INDEX OF FUEL OIL PRICES
AVERAGE POSTED PRICE OF P.S. 400 OIL F.O.B. TANK CARS, RICHMOND
(1939=100)
220
200
180
160
140
120
100
80
1918 '20 '22 '24 '26 '28 '30 '32 '34 '36 '38 '40 '42 '44 '46 1948 (7 MOS.)
SOURCE: STANDARD OIL COMPANY OF CALIFORNIA PRICES QUOTED IN EXHIBIT NO. 1 IN CALIFORNIA PUBLIC UTILITIES COMMISSION CASES NOS. 4936 & 4937.

Fig. 7

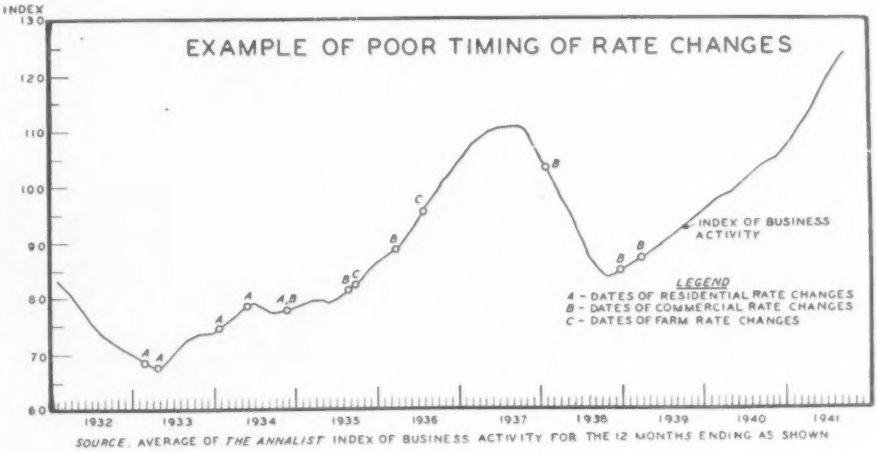

INDEX
130
120
110
100
90
80
70
60
EXAMPLE OF POOR TIMING OF RATE CHANGES
INDEX OF BUSINESS ACTIVITY
LEGEND
A - DATES OF RESIDENTIAL RATE CHANGES
B - DATES OF COMMERCIAL RATE CHANGES
C - DATES OF FARM RATE CHANGES
1932 1933 1934 1935 1936 1937 1938 1939 1940 1941
SOURCE: AVERAGE OF THE ANNALIST INDEX OF BUSINESS ACTIVITY FOR THE 12 MONTHS ENDING AS SHOWN

Fig. 8

* Re **Mountain Fuel Supply Co.**, Utah Public Service Commission case No. 3275, quoted in **Public Utilities' Fortnightly**, October 7, 1948. Page 529.

* "What of the Industrial Load?" by H. J. Flagg, executive officer of the Board of Public Utility Commissioners of the State of New Jersey, **Electrical World**, Aug. 28, 1948.

is a good time for a housecleaning. Make the buying of electricity easier for the customer to understand.

Timing Rate Adjustments

There is just one other important matter to consider. Utility rate matters move slowly. Too, often, rate changes are delayed so long that the favorable economic conditions, which existed at the time they were first proposed, have disappeared. One more chart will illustrate what can happen. The curve on Fig. 8 shows a national Index of Business Activity during and after the depression. Indicated on the curve are the effective dates of 13 rate changes, of which the author made a study some years ago. All of them resulted in decreases to customers. Those marked "A" concern groups of residential customers. The pressure for rate reductions was continuous during the decline in business prior to 1932; but the reductions finally took place in 1933 and 1934, when the business cycle was on the way up. The favorable effects, so far as customer relations were concerned, were thus entirely lost.

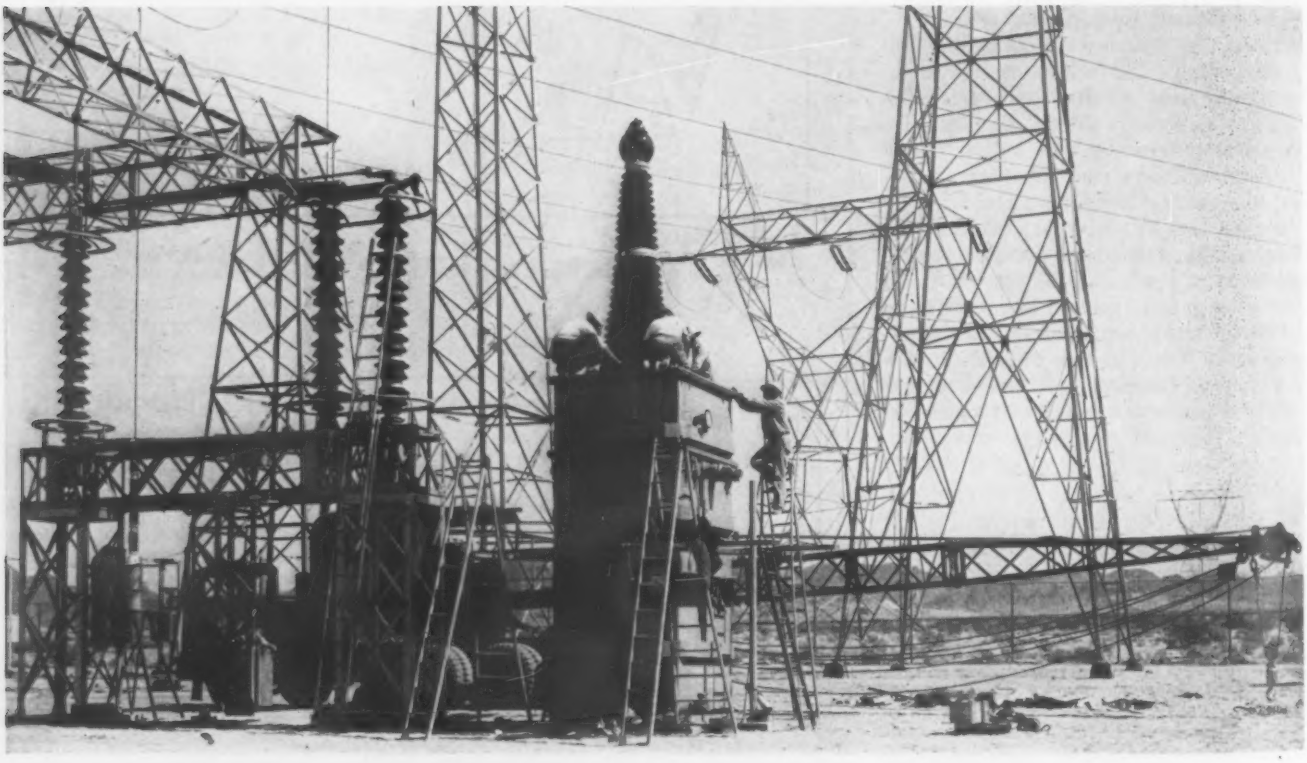
The timing of commercial rate changes is shown by the letter "B." These were delayed until well after the bottom of the depression. Only one of them, in January 1938, was on the down side of a cycle. Two changes of rates in farming areas, indicated by "C," also lost much of their good effect by being postponed until business was well along toward recovery.

These remarks serve to point up a statement made by the late Lester S. Ready, before the California Municipal Utilities Assn. in 1946:

"If increases are necessary they should be made promptly and prior to the temporary recession or settling down that may be expected within the next two or three years."

If such a recession was expected in 1946, it is still closer now. The time, necessary to plan new rate schedules where they are required, and support them with adequate cost analyses and studies, is running out. It is almost obvious that customer resistance to a rate boost is less acute, when all prices are going up, and when wages, employment and business are at high levels, than it will be, when a decline is in progress.

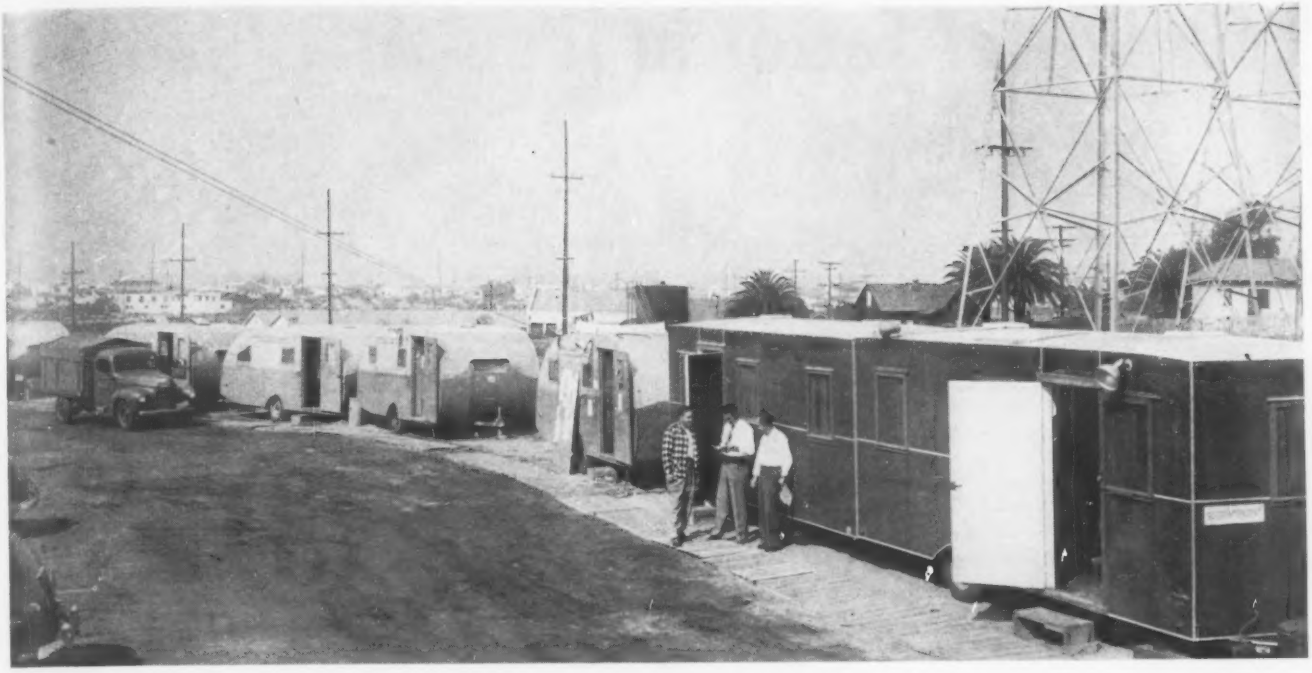
Many will recall that, a number of years ago on his radio program, Alexander Woolcott instituted a search for original inscriptions on sundials. The one he liked best, and one which applies uniquely to the utility rate increase situation now, reads: "It is later than you think."



287 kv. Tapped For 300 kva. Load

TAPPING a major high-voltage transmission line for a small distribution load is something rare, but this very thing was done recently by the Los Angeles Department of Water & Power when its Hoover Dam 287.5-kv. lines were tapped to feed a desert substation and its accompanying load. Two 300-kva., 287.5/4.8-kv. single-phase transformers built by General Electric Co. were installed at Silver Lake Switching station to serve the department's load requirements of the area. The installation was made to eliminate the high maintenance cost of nine engine generator sets and because of the absence of any local distribution supply—the nearest being 57 miles away. It is estimated that the installation will pay for itself in ten years through lower maintenance cost. Present power requirements of the station area are 145 kva., which includes all-electric operators' cottages. Reliability of present-day electrical apparatus was another factor that entered into decision to tap two of the three main Hoover Dam-Los Angeles trunk transmission lines.

This was a special case, of course, and does not necessarily reflect a trend. However, it is interesting in view of the fact that the Bonneville Power Administration, for example, is coming more and more to the philosophy of considering its 230-kv. lines as distribution lines that may be tapped for comparatively small loads.



Trailer camps were set up for field operations by contractors' crews and Edison crews as frequency change progressed over an area of 18,500 sq. mi. These are some of the trailer-shops set up in Redondo Beach by the California Electrical Maintenance Co., one of the contractors. Another part of the frequency change, that of converting electric railway load, was handled by trailer substations that moved from area to area as work progressed

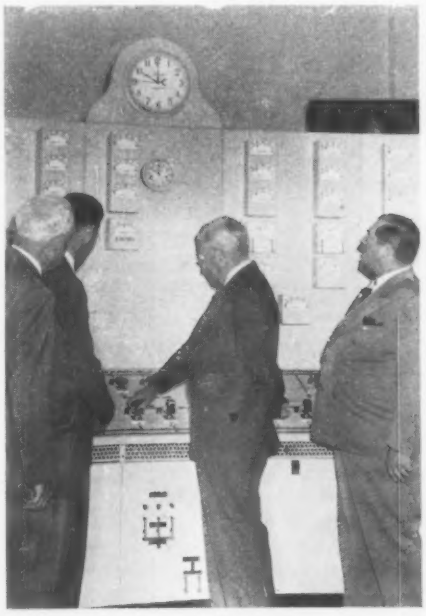
Edison Frequency Change, Big Job Well Done

ON the exact second decided upon two years earlier, Southern California Edison Co's. last 50-cycle customers were cut over to 60 cycles at 9:59¾ a.m. on Oct. 26, 1948, when Harry J. Bauer, chairman of Edison's board of directors, operated a switch in the company's LaFresa substation. To have completed this 37.5 million dollar postwar undertaking on schedule in the face of material shortages and manpower troubles, while at the same time being confronted with unprecedented load growth and one of the largest construction programs in the company's history, was a remarkable feat. All done, too, with a minimum of inconvenience to customers.

Except for a small pilot area of about 4,000 customers in Bell Gardens, the program started with the cut over of four feeders in Santa Barbara on Sept. 4, 1946. Feeders were cut over on regular schedule after that date until 1,179 feeders, serving more than 730,000 customers, had been changed to 60 cycles when the program was completed on Oct. 26.

Preliminary figures show that the program involved converting or replacing 593,977 clocks and timers; 7,708 deep-well turbine pumps; 391,000 fluorescent fixtures; 57,287 refrigerators; 34,127 washing machines; 161,612 record players, and 217,000 items of professional, industrial and electric railroad equipment with connected load of 2,355,880 hp.

Much of the huge job was done under contract. Contractors engaged on the project were: Stone & Webster Eng. Corp.; Bechtel Corp.; California Electrical Maintenance Co.; California Electric Service Stations; Fluorescent Maintenance Co., and a number of smaller, specialized subcontractors. As many as 2,000 persons were engaged in the work at one time. Edison created a special frequency change department in 1945, headed up by Wayne N. Johnson, formerly ass't manager of operations. He was assisted by J. D. Enefer, ass't manager; E. B. Kruger, commercial engineer; E. E. Tugby, planning engineer; C. L. Sidway, principal engineer; S. A. Ward, conversion engineer; and G. M. Richardson, purchase engineer.



Completion of Southern California Edison Co.'s. 37.5 million dollar frequency change program was an occasion for ceremony. Harry J. Bauer, chairman of the board, pulls switch that cuts over last feeder at 9:59¾ a.m. on Oct. 26, 1948. From left to right are R. R. Walbridge, vice-president and Wayne N. Johnson, manager of the frequency change department, looking on while H. W. (Bert) Tice, vice-president, watches clock to give Bauer time signal to pull the switch

Low Power Factor in Industrial Plants—

and what to do about it

W. C. King
Los Angeles

III. WHICH CORRECTION COSTS MORE?

A synchronous motor or an induction motor with capacitors?

SUPPOSE we are planning a pump drive of 350 hp. at 1,200 r.p.m. Power supply is 440 volts, three phase, 60 cycles. Let's compare the cost of a unity PF synchronous motor with an induction motor combined with a capacitor to maintain the over-all power factor at unity.

Synchronous motor	$3,093
Exciter	342
Control	1,318
Total	$4,753
Induction motor	$3,116
Control	926
Total	$4,042

Induction motor efficiency is 92.8; full load input will be 282.4 kw. Assume the power factor is 91.2, then lagging rkva. will be 127.0.

Average capacitor cost is $6.20 per kva. Capacitor to balance 127 lagging rkva. of the induction motor will cost $787.

Ind. motor; control; capacitor	$4,829
Syn. motor; exciter; control	4,753
Difference	$ 76

Proceeding as above, let's work out the difference in cost considering an 80% leading PF synchronous motor.

Syn. motor; exciter; control	$5,470
Ind. motor and control	4,042

Efficiency of synchronous motor is 93.2, then input at full load is 280.5 kw. Rkva. at 80% power factor is 210. We saw above that the lagging rkva. of the induction motor is 127.0; therefore we need a capacitor of 337 kva. to get the same result as if the synchronous machine were used.

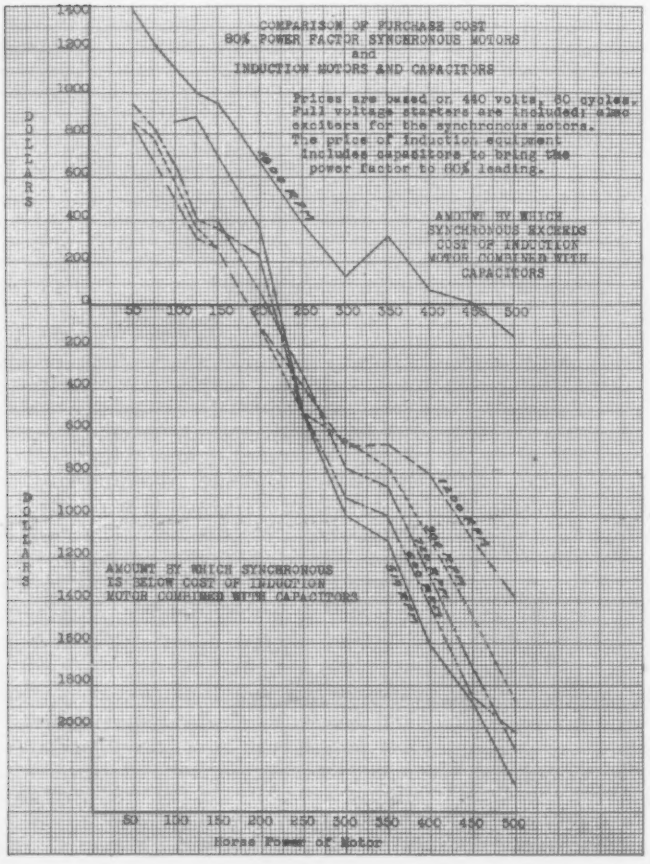
Cost at $6.20 per kva. $2,089

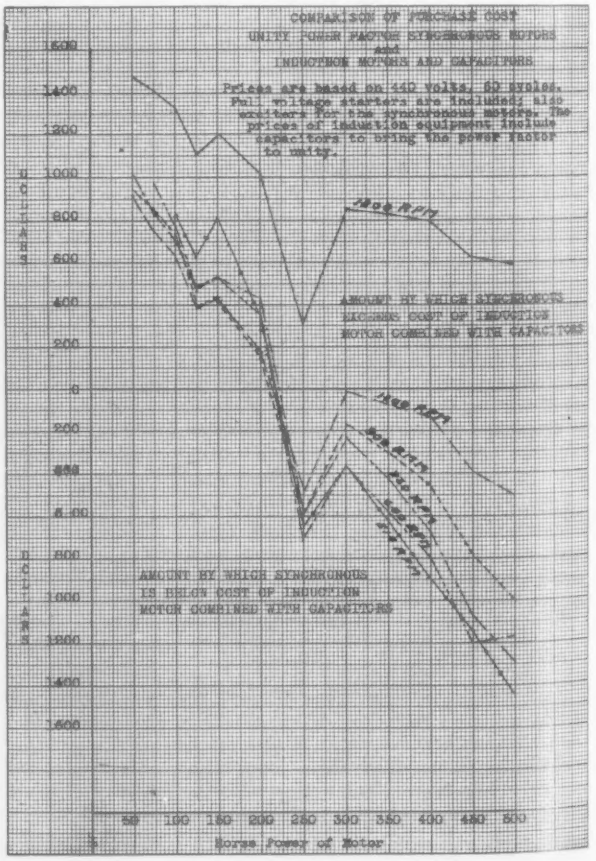
Summary

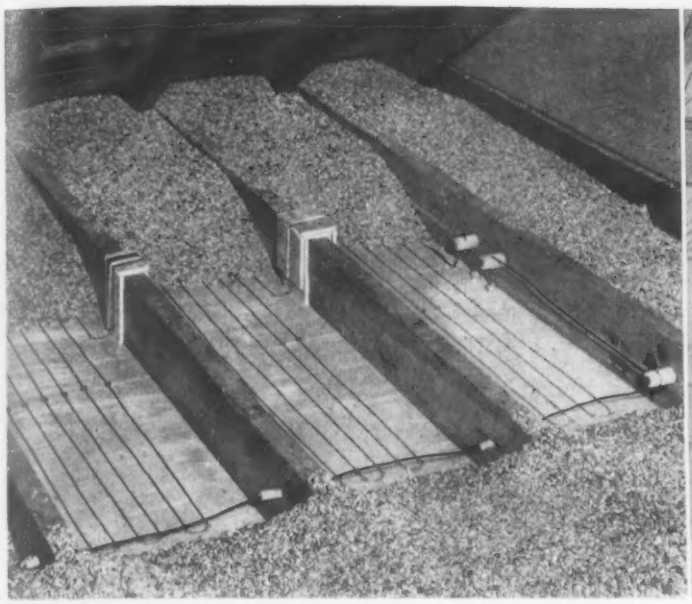
Ind. motor; control; capacitor	$6,131
Syn. motor; control; exciter	5,470
Difference in favor of syn.	$ 661

The results of calculations like those above have been plotted for motors from 50 to 500 hp.; 514 to 1,800 r.p.m.

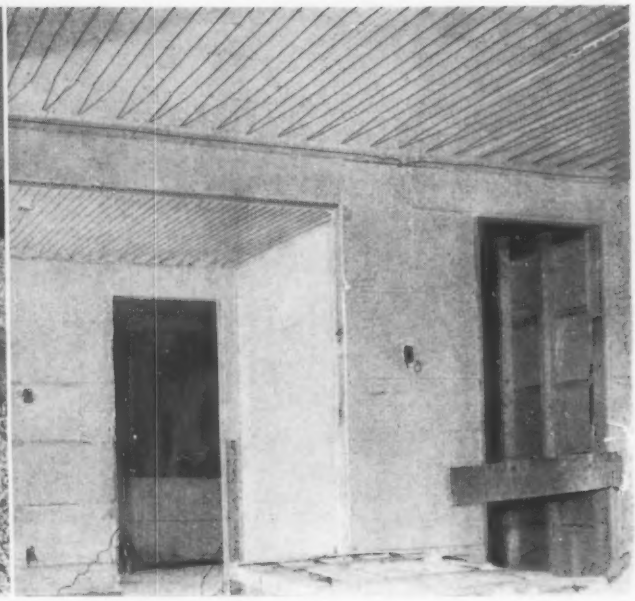
Where the two methods show almost identical costs, the induction motor might be favored as being simpler. But there is an efficiency difference in the two types of motors which may affect the decision. This will be discussed in the next article.


COMPARISON OF PURCHASE COST
80% POWER FACTOR SYNCHRONOUS MOTORS
and
INDUCTION MOTORS AND CAPACITORS
Prices are based on 440 volts, 60 cycles. Full voltage starters are included; also exciters for the synchronous motors. The price of induction equipment includes capacitors to bring the power factor to 80% leading.
AMOUNT BY WHICH SYNCHRONOUS EXCEEDS COST OF INDUCTION MOTOR COMBINED WITH CAPACITORS
AMOUNT BY WHICH SYNCHRONOUS IS BELOW COST OF INDUCTION MOTOR COMBINED WITH CAPACITORS
DOLLARS
Horse Power of Motor


UNITY POWER FACTOR SYNCHRONOUS MOTORS
and
INDUCTION MOTORS AND CAPACITORS
Prices are based on 440 volts, 60 cycles. Full voltage starters are included; also exciters for the synchronous motors. The prices of induction equipment include capacitors to bring the power factor to unity.
AMOUNT BY WHICH SYNCHRONOUS IS BELOW COST OF INDUCTION MOTOR COMBINED WITH CAPACITORS
DOLLARS
Horse Power of Motor



Method of installing in existing ceiling over plaster board. Note doubled plaster board where element crosses joists to diffuse the heat that might otherwise be trapped there



Cable applied to rock lath ceiling by staples. It is now thought desirable to use two staples for square ends on each loop. Plaster finish is applied over this grid pattern

Methods Developed for Built-in Radiant Heat

First of two articles—covers methods and code developed in Washington state and some California experience

RADIANT panel heating is very much in the public's eye these days. And it seems to have caught or intrigued the fancy of many who contemplate building. Much of it is being installed. In fact installation seems to be far ahead of accurate knowledge as to just how best to do so. Especially is this true of electric panel heating derived from resistance wires cast into either concrete floors or plaster walls and ceilings. The National Electrical Code has not yet caught up with this recent development.

Because the West has been the pioneer in electric panel heating, with installations dating back ten years in the Northwest, the fund of experience with this method of heating is concentrated pretty much in this region. With the keen public interest in such heating, it is well to bring up to date the know-how thus far achieved. It is of value to electrical contractors, electrical inspectors, engineers and designers, architects, to know how best to install such electric heating wire safely and efficiently. It is important to the utilities to know what kind of load it is. For all it is vital that jobs be well engineered so that heat losses be held at a minimum and costs held low, for there is no electric generating capacity to waste these days.

ELECTRICAL WEST has sought to keep the industry fully informed as to the economics of electric heating by publishing a number of reports of experience in various parts of the West. Other articles have detailed installation methods for the conventional wall-insert heaters, baseboard-type heaters, fan-type heaters, reverse-cycle systems, furnace types with strip heaters in air chambers, hot water storage systems, hot water radiant panel installation and the Tice system of buried or cast-in-concrete flexible steel cable.

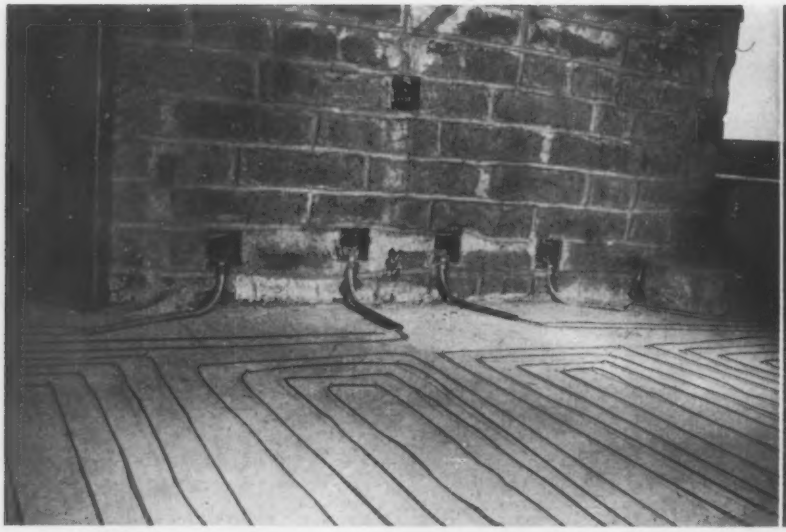
These articles summarize the system and variations pioneered by L. N. Roberson of Seattle, the electrical rules of the State of Washington derived from experience with the Roberson system, experience in California with variations of that idea and rules suggested by a committee report to the Southern California Chapter, International Assn. of Electrical Inspectors.

The Washington state installation rules, which may well be used as a guide for writing National Electrical Code requirements for its next edition, are printed here in full, with comments as to variations recommended by others. Photos accompanying this article illustrate details of the installation methods. Next month diagrams give schematic arrangement of circuits and breakers and load-limiting devices to provide the maximum diversity, improve load factor and reduce demand. Tables will supply some operating cost data that indicate costs in well-engineered installations.

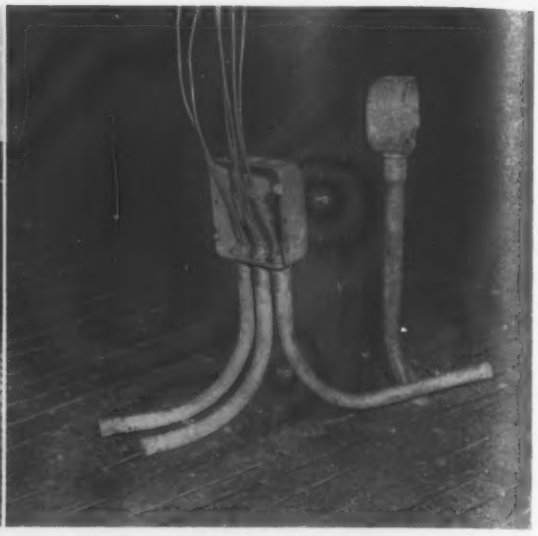
From Thomas L. Matney, chief electrical inspector, Department of Labor and Industries, State of Washington, some interesting comments come relative to types of resistance wire and insulation. W. C. Selfridge, electrical contractor, Fullerton, Calif., relates details of experience with several jobs in that area.

Because of length, this article is broken into two parts. In this issue the Washington rules are published in full because they are the only ones so far developed for such installations and seem entirely reasonable. With these rules are shown some installation methods, both by photos and diagrams. In the January issue will follow the second part, in which experience with such systems is discussed—good and bad. Also covered will be the cost of operation data and a method for limiting load demand.

Matney writes that there are from 1,000 to 1,500 buildings and homes in



In an Oakland house cable was strung around hard nails driven in concrete, grouted, then nails pulled and finish coat poured. Porcelain terminal block used in each box



Typical job stapled to exploded mica insulating concrete. Splices between element and non-heating lead wire remain in the concrete to prevent heat developing in the conduit

Washington state heated in this manner, all of them operating satisfactorily with the exception of two in which the heating wire was covered with a polyvinal chloride insulation over a copper alloy and trophet "C" resistance conductor, which will be discussed later. Among buildings so heated is the Bureau of Reclamation elementary school at Grand Coulee. This type of heating was installed in the floor two years ago and has proved satisfactory.

A number of houses in and around Fullerton, Calif., have similar systems installed in the floors, derived from previous experience with soil heating cable in agriculture. Other types of resistance wire have also been tried in that area and around Pasadena.

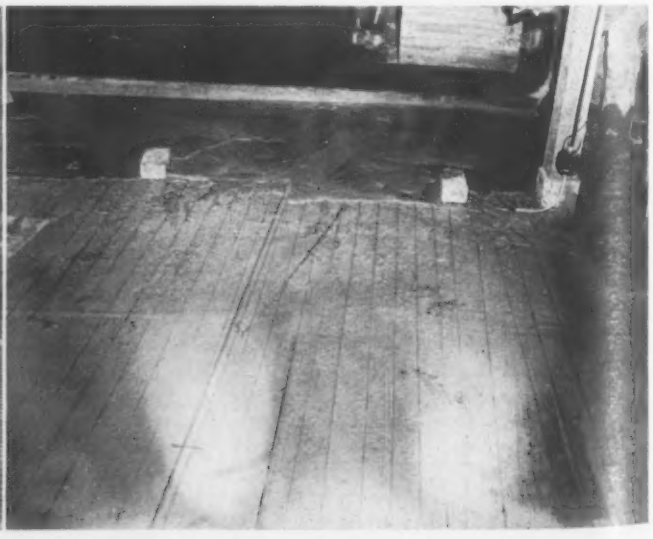
The Northwest installations developed out of Roberson's experience in designing, constructing and selling of standardized, packaged greenhouses for homes and commercial nurseries. Roberson also pioneered soil heating and soil sterilization, and from these developed a type of thermosetting plastic coated resistance wire which he markets in packaged lengths under the trade name, Heatsum cable. Having developed the system during the past ten years he has likewise accumulated experience with wiring methods, design layout and thermostatic control which he now markets with an engineered layout for a given floor plan submitted to him.

From this experience he recommends that heating circuits of No. 12 be run from the main panel to the switch box and the thermostat box of each area to be heated. Loom or raceway is then run from the thermostat box either to the space between ceiling joists and above the plaster line, if the heating is to be installed in the plaster or on plaster board, or down to floor level if the heating element is to be in the concrete or other flooring. Originally a terminal box was installed near the floor level in the wall. This was used to terminate the heating element wire from the floor and make connections to the supply circuit wire in the box. But now, since most such heating cable is made with a length of non-heating lead wire at each end of the standardized wattage unit length of resistance wire, this terminal box can be eliminated and the lead wire taken into the thermostat or switch box direct.

After the ceiling is lathed it is rec-

Topping being applied over cable stapled to insulating concrete of magnesite — soft enough to permit stapling

Cable secured to strips of insulating board imbedded in concrete. The ¾-in. pipe is used as concrete screed only



ommended that the element wire be stapled to the under side. Staples are placed about 2 ft. apart. Spacing in inches between cables is determined by a formula: Width of the room, minus 1, times length of room, minus 1, times 12, divided by the length of cable in feet. The length of cable is determined by the calculated wattage required to heat the room and to take care of heat losses, in the conventional manner. Cable is made in several wattage lengths from 175 watts to 3,000 watts.

Cable and leads should be kept at least 2-in. clear of metal lath or metal reinforcing to avoid magnetic hum.

Where installed in concrete or magnesite floor, each cable end should be encased in fiberglas sleeving or loom where it enters the raceway to be taken up to the thermostat box. Elements should be tested with bell and battery or line voltage to make sure no breaks have opened the circuit. Neon glow lamps are not recommended for testing as they show a glow at line voltage even though the circuit may be open.

Plaster should be allowed to dry for a week in summer and two weeks in winter, according to Roberson's instructions, before heat is turned on Then the rooms should be brought up to temperature slowly, at a rate of 4 deg. per day. If the temperature drops below 50 deg. the rooms should be brought up slowly.

Installed in existing houses, the cable can be laid on top of plasterboard or fire-resisting finish but not directly on wood or lath. A sheet of asbestos paper should be used between cable and wood. Pictures show the installation method, with exploded mica insulation poured over it when finished. Note the means for crossing joists with the cable. A piece of plaster board is used under the cable and over it to conduct heat away from the cable to a larger area.

Roberson's directions for installation in concrete are as follows: "A frame is first made from scrap lumber for each room. A row of nails is placed at either end and the cable wound and evenly spaced. The electrical contractor should be present when the floor is poured and as the first three inches of concrete are poured and leveled off he places the frame down on the floor. The pouring is continued. When sufficient concrete covers the element and holds it securely, the frame is slipped out and the surface finished. Care should be taken that none of the turns touch each other and the circuit should be tested immediately."

In the Opdall house in Oakland a different method was used. The cable was laid on the rough concrete slab around special hard steel nails designed for driving in concrete. Then the finish coat was poured over it all. Where magnesite flooring is used the underlayment is poured and the element can be stapled to it, then the finish coat poured.

Cable stapled to plaster board wall where more radiant surface is needed, runs vertically so plaster parallels it

There are many refinements of detail, particularly in the insulation of houses, the providing of a highway expansion strip at the edges of a concrete floor, as well as heat loss information in various climates that are part of any well-engineered design for house heating. This article seeks to lay down the fundamentals and practical installation rules only.

In the next issue the advantages of this type of heating will be given. Also some of the peculiarities of its performance, some of the "bugs" or difficulties to be avoided as discovered by costly experience; some operating cost data and discussion of methods of control of the system with special emphasis on the desirability of load limiting to reduce demand, improve load factor and reduce operating cost.

W. C. Selfridge Tells His Experience

Several years ago, when the General Electric Co. first manufactured lead-covered soil heating cable, we installed about 500 ft. of this type cable five inches under the top soil within a glass enclosed greenhouse to be used as a warming agent for the soil, the thermostat set at about 65 deg. This installation was very satisfactory for seed germination. We received many inquiries and made a few installations for seed beds, with covering and without protection.

In the past few years, we have installed electric radiant heat in concrete slab floors of large and small homes. The resale value of installing lead soil heating cable, with service and controls, will run from one dollar to two dollars and fifty cents a square foot.

We have used several methods in concrete mix, and have eliminated pumistone. To stop capillary attraction of moisture we are using the following method of floor construction:

1. Lay and roll 6 in. of coarse aggregate (rock).
2. Pour 4 in. concrete on this rock base.
3. When concrete is dry, lay a heavy felt paper. Install soil heating cable, then mop with hot roof asphalt.
4. Complete concrete floor with 1½ inches and finish.

In installing the soil-heating cable in concrete floors, we have found that a barrier, such as felt paper, serves two purposes. It makes a seal and holds the asphalt around the cable, thereby letting the expansion and contraction take place without cracking the finished concrete floor.

On two of the residences we installed glass-insulated nichrome wire as the heating element and found it to work fairly well, except that in two cases there developed grounding from the floor to the sink. The concrete floor was then covered with asphalt tile as a means of insulating it.

When either type of floor heat is installed there should be some mechanic to stay on the job at all times while the cable is exposed and during the covering with concrete. Otherwise cable may be damaged and fail to operate.

There is, however, another floor covering of coarse sawdust mixed with some chemical to cause the floor to set up; it is then sanded and polished. This type of floor is about three-quarters of an inch thick and shows no cracks at all after hard usage.

The electric load should be figured at 100% load factor and the voltage at 220 to 240 as the length of each element is 120 ft., at 900 watts.

In figuring the amount of soil heating cable required for an installation, it will depend on the room to be heated. The bath requires more heat than the other rooms and the kitchen does not require a great amount more than a bedroom. There should be a floor layout made of the job and the heat plan incorporated by a competent architect or engineer.

The cost of a complete electrical floor heating plan and specification using soil-heating cable, according to the floor space to be heated, would run from $200 up. Houses or commercial buildings would take about the same engineering for up to about 300-amp. load; over that, current would, of course, take a different figure. It depends, too, whether or not the side walls or ceiling are to be heated, and the construction material is a factor in the latter case. However, the average home, of up to about 1,500 sq. ft. of floor space, would run at the above figure.

Care should be taken in the selection of the thermostatic control. There are several first-class brands to choose from. There are types with bulb control that are more efficient than others without bulb. Control should be as near accurate as possible. Bedrooms, in general, should be set at about 70 deg. A thermostat also should be installed on the outside of the house, on the west side or shady side to control the main heating. This would not let the inside of the building get so warm that additional heat from the outside would increase the room temperature.

The radiant electric floor heat is very satisfactory as it does not heat the floor or wall. The heating is done by radiation, similar to radiation of heat from the sun. The human body gives off heat at the rate of about 400 B.t.u. per hour. A B.t.u. is about equal to the burning of one match, so it can be understood why many persons in a room will cause the heat to rise quickly—and therefore the need for a sensitive thermostat.

The power cost for a home with electric range, water heater, dishwasher and floor heat will be around $250 per year in Southern California Edison territory.

Washington State Rules for Heating Cables

1. GENERAL. Heating cables or wires designed for use in low-temperature heating applications, i.e., soil, water, plaster, walls and ceilings, floors, etc., shall conform to the provisions of the N.E.C. Article 422 as applicable and to the following specifications:

A. *The units shall be manufactured in such continuous lengths* that the maximum temperature of the elements does not exceed 100 degrees C. or the maximum safe working temperature of the insulating material covering the element. Whichever is the lower temperature shall be considered the maximum permissible working temperature of the element.

B. *Insulation.* 1. Insulation on the element and connecting leads shall not be less than 600v-75C and shall not corrode the heating element or leads.

1a. *Dry Location.* For dry locations such as: over existing ceilings, walls or floors, or where covered by suitable fire resistant dry finish as specified under Article 3, Sections F, G, and H, insulation shall conform to requirements specified for dry locations as defined in Article 310, Sections 3101 and 3102 of the National Electrical Code.

1b. *General Use.* For general use as specified under Article 3, Sections B, D, E, F, G, and H, and insulation shall conform to requirements for general use defined in Article 310, Sections 3101 and 3102 of the National Electrical Code.

1c. *Wet Locations.* For wet locations the insulation shall conform to the provisions of 1a and b and in addition shall conform to combined specifications for type RH and RW insulation and the following: Permissible maximum water absorption shall not exceed .015 grams per sq. in. of surface at 75C in 7 days.

2. It shall be suitable for the purpose intended and approved by the Washington State Electrical Inspection Department as such.

3. *Samples for testing.* The manufacturer shall submit suitable samples to the Washington State Inspection Department for inspection and testing as required.

4. *Marking.* Each unit shall be provided with permanent labels or markings at the factory.

a. These labels shall be placed not more than 3 in. from the terminal on each end and shall include the makers' name and the normal rating in volts and amperes; or, volts and watts.

b. 120-volt labels shall be bright metal or white in color. 240-v. labels shall be colored red.

5. Units shall be installed in their complete lengths as supplied by the factory. Units from which a label or labels are missing will be considered shortened and will not be approved until such time as the installing contractor shall provide proof, by connecting suitable test meters into the circuits with which the inspector, at his convenience, may satisfy himself that the element is suitable for the purpose intended.

6. Heating element units shall not be covered until clearance has been received from the local inspecting authority.

7. Lead-covered heating elements shall not be permitted in direct contact with plaster, concrete or similar materials capable of causing crystallization and/or checking of the lead sheath, unless protected by a suitable covering of chemically inert material.

8. All control equipment must be of approved type and of suitable rating for the use intended.*

2. MAXIMUM WATTAGE AND TEMPERATURE.

A. *In Contact With Combustible Material.* Maximum wattage of the element shall not exceed 3 watts per lineal foot or maximum temperature of 60 degrees C. (140 degrees F.) when in direct contact with combustible material or applied over existing ceilings.

B. *Imbedded In Cement.* Maximum wattage of the element shall not exceed 4 watts per lineal foot or maximum temperature of 80 degrees C. (194 degrees F.) when imbedded in cement, plaster or similar non-combustible, heat-diffusing material.

3. PERMISSIBLE INSTALLATION METHODS IN BUILDING. Wiring to the elements shall conform to the National Electrical Code and to the following conditions: Heating elements designed for radiant house heating by being embedded in plaster, concrete or similar non-combustible material shall be equipped with non-heating leads insulated with insulation equal to that of the element to which it is attached, and at least 6 ft. in length, said leads to be attached and insulated at the factory.†

B. *Imbedded In Plaster.* Heating elements, when imbedded in plaster, shall conform to the following provisions:

1. Adjacent turns shall be not less than 1 in. apart and secured suitably by insulated staples, adhesive tape, patching plaster, plaster of paris, or other suitable means of attachment, as approved by the local inspecting authority, on not less than 2 ft. centers.

2. Non-metallic insulating tape shall be used where the element crosses metal reinforcing on rock plaster board and similar lath substitutes, when the heating element is applied directly to the lath base. (Where possible, non-metallic reinforcing should be substituted to avoid the hum that is occasionally generated in the reinforcing while the current is on.)

3. When heating element is used on a surface employing metal lath base, a brown coat shall be applied sufficient to completely cover the metal lath before the element is applied; and, adhesive tape, patching plaster, plaster of paris, or other suitable means of attachment be used to secure the element in place.

4. Heating element shall only be applied to fire-resistant plaster bases.

C. *Imbedded In Concrete Floors.* Heating elements imbedded in concrete floors shall conform to the following provisions:

1. Adjacent turns shall not be less than 1 in. apart and shall be held securely in place by suitable frames or spreaders while the concrete topping is applied.

2. Heating cables shall maintain at least 1 in. clearance between the element and adjacent metallic pipe or similar conductors imbedded in the slab.

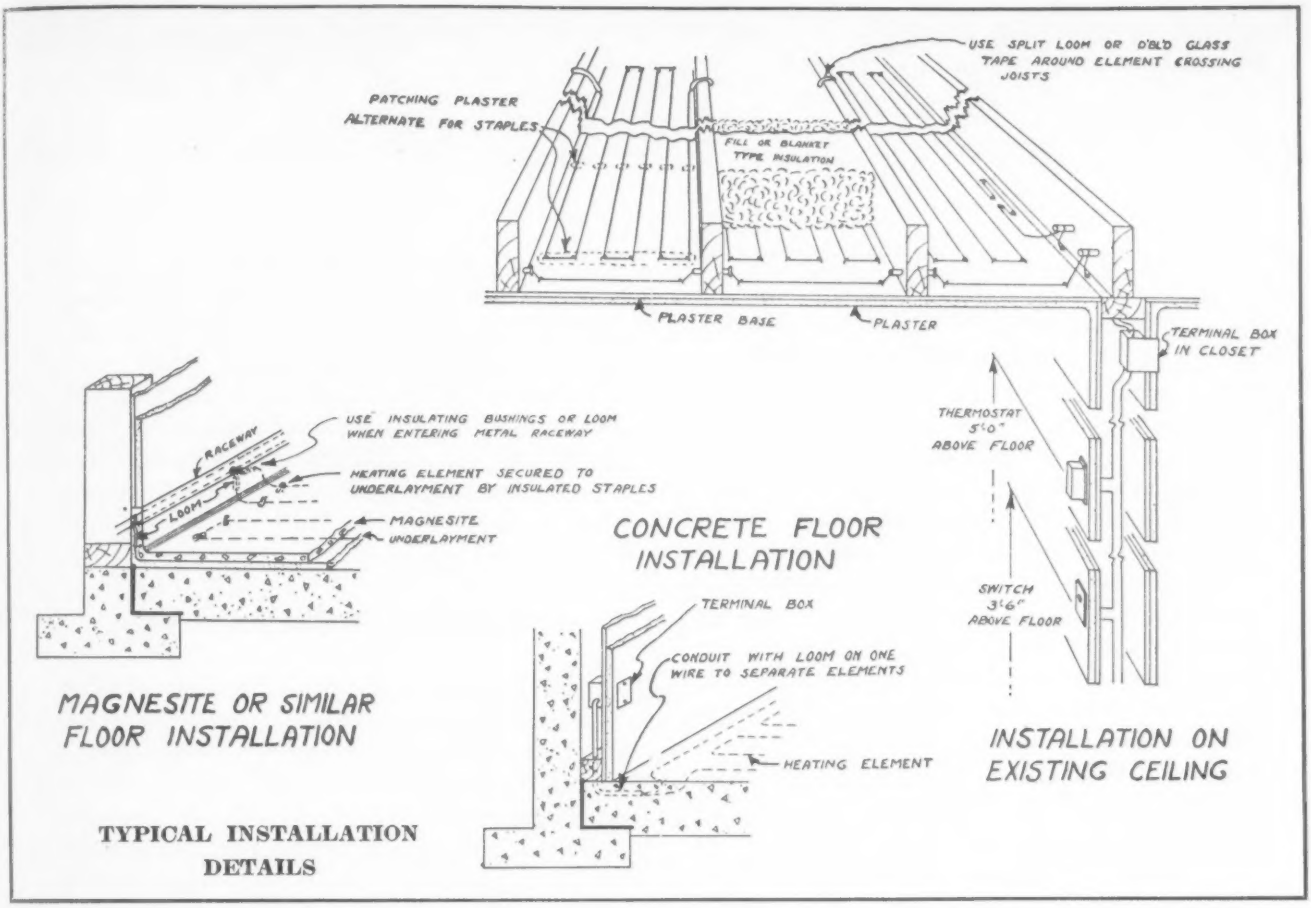
* Southern California chapter report requires: Not more than 4,000 watts shall be dependent upon any one overload protective device.

† Southern California chapter report contains these rules regarding terminals, originally in Washington code but since removed:

Termination of radiant heating elements shall be with solderless lugs, binding posts, or similar compression-type terminals.

Radiant heating elements, and the circuit wires with which they are connected shall terminate in junction boxes. The element wires shall be protected by asbestos, glass or similar non-combustible sleeving, to a point at least 18 in. from the terminal. Not more than 3 in. of element per lead shall be permitted inside the terminal box, unless non-heating leads at least 24 in. in length are provided by the factory.

Not more than two heating element leads shall be permitted in any 4-in. or small box.


USE SPLIT LOOM OR D'BL'D GLASS TAPE AROUND ELEMENT CROSSING JOISTS
PATCHING PLASTER ALTERNATE FOR STAPLES
FILL OR BLANKET TYPE INSULATION
PLASTER BASE
PLASTER
TERMINAL BOX IN CLOSET
THERMOSTAT 5'-0" ABOVE FLOOR
SWITCH 3'-6" ABOVE FLOOR
USE INSULATING BUSHINGS OR LOOM WHEN ENTERING METAL RACEWAY
RACEWAY
LOOM
HEATING ELEMENT SECURED TO UNDERLAYMENT BY INSULATED STAPLES
MAGNESITE UNDERLAYMENT
CONCRETE FLOOR INSTALLATION
TERMINAL BOX
CONDUIT WITH LOOM ON ONE WIRE TO SEPARATE ELEMENTS
HEATING ELEMENT
MAGNESITE OR SIMILAR FLOOR INSTALLATION
INSTALLATION ON EXISTING CEILING
TYPICAL INSTALLATION DETAILS

Where non-heating lead wires are used terminal box may be eliminated and leads run into the switch box itself

3. Suitable rigid conduit risers shall be provided for terminating elements imbedded in concrete floors unless raceways or other adequate means are provided for protecting the elements where they leave the slab.

4. Insulating sleeves shall be placed over the element from the point where it enters the slab through the conduit to the terminating box, unless non-heating leads, not less than 2 ft. long, are provided with the element by the factory.

5. Suitable insulating bushings shall be used to separate the leads or elements where they enter the conduit in the slab.

D. MAGNESITE, TERRAZZO, TILE AND SIMILAR FLOORS AND WALLS.

1. Shall conform to the provisions of Sections A, B, and C as applicable.

2. Heating cables may be attached to the surface of the underlayment where magnesite or terrazzo floors are installed.

E. *Linoleum, Asphalt Tile and Similar Floor Coverings* may be placed over heating elements on wood floors providing the element is first covered with ⅜ in. of magnesium oxychloride or equal fire-resistant underlayment.

F. *Existing Ceilings.*

1. Heating elements placed over existing ceilings shall be suitably secured thereto conforming to the provisions of Article 2A, and Article 3A, B, and C as applicable.

2. When a radiant heating element is applied over wood lath, the element shall be covered by a layer of plaster, cement or similar heat-conducting material in order to fill the voids and provide adequate heat conductance to plaster keys projecting above or beyond the lath.

3. Heating elements shall not be applied over insulating board type of lath such as celotex, insulite, firtex, and similar materials. Where this type of material is used, the element should be secured to the under face of the ceiling and covered with plaster or fire-resistant board of a non-insulating type.

4. Elements crossing ceiling joists shall be encased in plaster, cement or similar heat-conducting material extending at least 1 in. beyond the element on each side along the joists or fished through porcelain tubes.

G. *Gypsum Board, Plaster Lath* and similar heat-conducting fire-resistant materials may have the heating element applied directly thereto and secured by insulated staples, plaster, concrete or similar heat-conducting non-combustible material.

H. *Ceilings of Combustible Material*; i.e., wood veneer, tempered hardboard and similar heat-conducting materials shall first be covered by 12 lb. asbestos paper, gypsum board or similar fire-resistant material.

I. *Pads Containing Heating Elements* for placing heating elements in spaces over existing ceilings or in walls or floors which are otherwise inaccessible, shall conform to the provisions of Sections 1A, 1B, 2A, 3F, 3G, 3H, and Article 4 as applicable, and the following specifications:

1. The pads shall be of fire-resistant, non-conducting material.

2. The pads shall rigidly secure the element in such a manner that it will be impossible for the adjacent turns of the element to touch.

3a. The leads shall be suitably secured to the pad in a manner which provides permanent adequate separation between the leads.

b. The leads shall be covered with an insulating sleeve from the pad to the termination of the heating part of the element.

c. All connections must be accessible.

4. THERMAL INSULATION placed over heating elements or in contact therewith shall be approved non-corrosive, non-combustible, non-conducting material.

5. ELEMENTS INSTALLED IN TANKS, TROUGHS or PIPE LINES CONTAINING LIQUIDS shall be provided with suitable insulating terminating bushings and terminal boxes at the points where the element enters and leaves the tank, trough, or pipe line. Elements so installed shall be secured in a manner maintaining at least 1 in. clearance between turns.

6. HEATING ELEMENTS IN SOIL OR SAND.

A. *Heating element in soil or sand* shall be so spaced that the minimum distance between adjacent turns is not less than 1 in.

B. *Heating elements shall never be placed directly in peat moss* or similar material of an insulating nature. Where peat moss or similar material is used, the element shall be protected by a layer of at least 1 in. over and 1 in. under the element, of a heat-conducting material such as sand.

C. *Suitable drains for condensation* shall be provided at the bottom of all boxes used in greenhouse or hotbed wiring.

D. *Where open wiring is used in greenhouses and hotbeds*, the use of non-metallic boxes and covers is recommended as provided in Section 3716 of the N.E.C.

7. HEATING ELEMENT IMBEDDED IN DRIVEWAYS.

Heating elements imbedded in driveways shall conform to the provisions of Article 1 and Article 2 inclusive and Article 3, Section C, as applicable.

ELECTRICAL WEST

Playing a Losing Game

THERE is a lesson to be learned from the election. "Don't get too far from the grass roots." Dopesters and pollsters and strategists from remote-control stations in New York and Washington got too far off the ground again to see what life really looks like at the people's level. It is a lesson this industry keeps learning the hard way and forgetting all too soon.

One branch of the industry that is walking into the same complacent quicksand that the Dewey forces did is the electrical contractors group. Its association is allowing itself to get too much insulation from ground. Playing a top-level game of appeasement with the union hierarchy, it forgets whom it is supposed to represent. Flushed with the inflationary wages it sanctions in agreements, it also thinks of hiking its own minimum dues. Nowhere in its publication is there expressed any concern about pricing itself out of business.

Nor is there any concern for the one who is supposed to meet all these increases—the customer. Little enough is there, if any, for the small contractor who must sell these high wages and dues to his customer before he can pay either the union members the wages or the association its dues, plus pension plan.

It is this forgotten customer who must never be forgotten. He is the one who upsets election dope. He is the one who either does *without* the job he needs to have done, or finds some other way to do it, even if it has to be non-union or bootlegged, or done with lamp cord and a prayer. Already in many areas of the West the residential wiring business is lost to the union contractor because the union scale is too high. Non-union contractors are doing this business at prices the public can afford to pay and paying the non-union electricians a wage that the public can afford. The point of diminishing returns has been passed.

In the face of even this reality, one California union is making absolutely fantastic demands in the negotiation of its contract with contractors—not only the pension plan but vacations with pay, hospital benefits, shorter work week and others. All of these, of course, sound beautiful to the union membership. But there is that forgotten customer again. Can he support all this social benefaction on top of high-cost electrical materials, high wages and poor efficiency? If he cannot and will not, the bubble, pretty though it is, bursts.

To be sure this a wonderful industry, with remarkable public acceptance and demand and unequaled opportunities. But if it has to carry too much non-productive featherbedding it may easily collapse from the load.

Manufacturer's Stocks Handy

MANY electrical manufacturers, sensing the dynamic growth of the West, are establishing plants in the region. Not all manufacturers can do this although many desire to do so. But there is something that all *can* do which their industry will appreciate. Stocks can be maintained here in the West so that quicker deliveries and better service may be had from them. With production improved more of this should be done — to everyone's benefit.

Still Far from Adequate

ONE of those nightmares that will live to haunt utility sales managers and appliance dealers for years to come is the 22-outlet war-built home. The tens of thousands of them will always stand as obstacles to greater appliance sales and larger kilowatt-hour use. But if sales managers and dealers expect any easier nights because of improved wiring in today's veteran's five- and six-room dwellings, they had better purchase a large stock of sleeping pills. For the wiring isn't in these houses either.

Southern California Edison Company has just surveyed a representative block of 1948-built houses. They show an average of 36 outlets per house, including ceiling outlets, wall receptacles and switches. At an average cost of $5 per outlet, the wiring totaled $186. The average allowance for lighting fixtures was $45.17. The two together total something less than 2¼ per cent of the building dollar. A reasonable — not necessarily adequate — job would have represented 4 per cent. Edison company figures that with 63,000 homes added

EDITORIAL VIEWS

to its system in 1948, the electrical industry lost $11,000,000 plus.

But that loss is only the beginning. For years to come the home owners won't buy appliances because the houses are not wired to permit their convenient use. And they won't consume much electrical energy for the same reason. And we think our industry is noted for its salesmanship!

A Big Load for a Baby

EXCEPT perhaps the heir to the British throne whose advent was awaited and publicized with such interest, no infant has been so talked about and prepared for as the infant television industry. But like the new prince recently born, television has a tremendous load of responsibility on it even before it is born.

Radio, refrigerators, motors, lamps and other electrical devices, which have so altered living and working habits, at least had childhoods—periods of slow development and growth. But television is like the Baby Weems of the Walt Disney film. It is expected to perform miracles and astound the world from birth almost. Experience with it elsewhere, however, recalls that no such full blown emergence takes place.

There is a wonderful future, but the steps up to it all cost money, lots of it. What costs most is talent, good programs. Without good programs television can be a horrible flop. Show business it is, and show business for high-grade shows is exceedingly costly. Yet to a public spoiled by excellent stage, movie and radio performances, television must seek to win a place in competition with these lusty rivals. Poor programs can blight the business this infant protege promises the industry.

What those who know fear most is that, in the hurry to get on the air, programming will suffer and television gets a black eye. The elaborate mechanism necessary before good programs can be produced on a national scale, so as to split the enormous cost among many stations and sponsors, has not yet been fully developed. It would serve everyone better if there were less impatience for television to come. Give the child a chance to settle its diet before putting such a big burden on it.

WE of the business world do have a voice. Our fellow citizens may not be interested in our political views but they are interested in the opinion of business leaders and business managers upon one question above all, viz: "How is Business?" Have we any right to assure our fellow citizens that business is wonderful and that we see no reason to doubt the genuineness or the continuance of this prosperity? Do we have any right to pretend not to see that which all of us must see—that we are in the midst of a dangerous inflation, that we are bound by the chains of an all-powerful government, and that the restrictions and rigidities imposed by this government will make it exceedingly difficult to restore the impaired elements of the free American market, and hence the American production system when once this inflation has run its dangerous course? . . . When we tell our employees and our customers who have confidence in our business judgment and the right to rely thereon that business is good and we can see nothing to be worried about, we are in effect assuring them that these great fundamental changes in our form of government and the consequent loss of freedom by all the people, are really not of vital importance. We are telling them that the enormous public debt which we have, the taxes we must continue to pay, the inflation which is in progress, and the burdens of our international obligations—that all these problems are under control, and that we see no reason to fear they will interfere with the present high production, the present high scale of living, or the present enjoyment of life by the American people as a whole. I submit that we are not justified in making any such representations either directly or by implication. I submit that to do so convicts us of blindness, unwareness, and of being apathetic trustees of our American free institutions. —W. C. Mullendore, president, Southern California Edison Company.

PCEA—MOSTLY ABOUT PEOPLE

PROBLEMS relating to people—how to sell them as customers, how to train them as better employees, how to live with them as "the public," and how to coordinate their efforts with modern machines and equipment—topped the list of subjects at the annual fall PCEA conference at Fresno, Calif., Oct. 28-29. The conference drew a record attendance of 495. Interest was keen as exemplified by the size of the audiences at section and committee gatherings. A new precedent was established also by members of the PCEA directorate—one member attended each of the individual meetings.

The one general session heard speakers point up future opportunities, rationalize the postwar Western industrial revolution and challenge the industry's leadership in dealing with its personnel problems.

H. H. Courtright, PCEA past president and San Joaquin division manager, PG and E, posed some of the industry's responsibilities for tomorrow. An adequate energy supply to meet the growing demands of old and new customers, geared-up sales and promotional programs, sound credit policies and a reinspired spirit of cooperation are musts in his opinion. He urged the development of plans to keep the industry's own people as well as its customers informed of problems, plans and progress. He concluded with the statement that "our planning today will determine our right for being proud of our industry tomorrow."

George C. Tenney, editor, ELECTRICAL WEST, sketched the upsurge of electrical manufacturing in the West that has occurred along with the tremendous postwar industrial development. Pointing out that electrical manufacturing had increased 228% in terms of pay rolls since 1939, he tied this growth to the Western industrial revolution. Here are some of his statements:

"Western industry has doubled in the last decade. Today half of all new industrial plants are being located in the South or West . . . .

"People make markets. The West is growing eight times as fast as the U.S. as a whole.

"Incomes and purchasing power attract industry like honey attracts bees. Surveys show that seven Western states have greater effective buying incomes than the U.S. average; nine are above the U.S. average in retail sales per family and ten exceed the national average in cash income per farm . . .

"The Far West has an over-all favorable climate for industrial development—superior living conditions, unexcelled working conditions and a cooperative attitude on the part of its people . . . . .

"Our resources are varied and abundant—fuels, chemicals, minerals, timber, fisheries, electric power and the soil and climate that give the region its great agriculture . . . . . .

"The war gave the West the metallic base that is an absolute essential for a solid and well-rounded industrial economy. Steel ingot capacity trebled and light metal manufacturing capacity quadrupled . . ."

The region has its liabilities, Tenney pointed out. Among them he listed geographic isolation from the center of U.S. population and consumption, deficient oil, natural gas and water supplies in the Pacific Southwest, and a generally bad labor record for the whole region. This latter, particularly as regards higher costs, is more than offset by higher production rates, Tenney asserted.

He cited figures to show that the West's industrial assets more than offset any liabilities. Industry has expanded in 18 out of 20 classifications. Growth is at three times the national rate. Metal and chemical processing have trebled in a decade. "In fact," he said, "the Far West has attained industrial maturity and is headed toward its manifest destiny as the nation's new and most promising industrial frontier."

Ab Martin's inspiring dissertation on "Releasing Human Potential Through Leadership" is published in part on page 67 of this issue.

Public utility officials and other executives of the electrical industry

President M. G. Sues

were advised to "use research to find out what the public wants, then give the public what it wants in the way it wants it" by Ralph Yambert, guest speaker at the closing PCEA luncheon on Friday. He said that this was a sound policy of public relations which would succeed when the more common method of trying to make the public want what the company is giving it, would fail.

Adminstrative Services

J. K. Uhler, Chairman
L. W. Brillhart, Vice-Chairman

PEOPLE—as employees, customers and employers — again took the spotlight in much of the discussion at Administrative Services Section meetings. Tools and procedures of business were not neglected, however.

With the increase in volume of checks used, it is increasingly important to eliminate the "headache" check, P. C. Hale, treasurer, So. Calif. Ed., pointed out in a cleverly illustrated talk, "Check and Double Check." This useful tool of modern business should be standard size, simple in design, with standard location for essential data, he stated. Postcard checks, boxcar checks, cluttered checks requiring a good puzzle worker to find the essential data, checks printed the long way, checks used as an advertising medium—all increase the labor of sorting, running, posting and balancing; lend themselves to alteration and forgery. It is estimated, he pointed out, that each check, from the time that it is issued to the time it ultimately is paid, is handled at least three times.

Machine checks are here to stay, Hale said, but reminded the group that even the installation of costly accounting systems does not prevent design of the check so as to comply with requirements of simplicity and standardization.

Martin

Uhler Hale

Too much importance must not be placed upon safety or water-marked paper; he warned, though they do add an additional element of protection. With the increasing number of ficticious checks issued and checks forged or altered by organized gangs, the greatest single protective measure is to adhere to the rule, "Know your endorser—require identification." To prevent loss and consequent higher bank service charges and insurance rates, he advised business to (1) prepare adequate checks; (2) set up controls; (3) train personnel to know essential information; (4) encourage courteous yet cautious dealings with the public.

In dealing with people, we are likely to indulge in two fallacies, Paul Eliel, industrial consultant, San Francisco, declared in a discussion of supervisor—staff relations—a discussion which he said was in part a review of Alexander H. Leighton's book, *The Governing of Men.* These fallacies are (1) that human nature is the same anywhere; (2) only occasionally are people under stress or tension. Men in fact are different and groups are different and they are under stress some part of most of their waking hours, certainly they are under stress as workers, he declared.

Manifestations of stress are isolation, rejection by others, ridicule, capricious action by authority. Evidence of stress are absenteeism, poor production, rule violation, intoxication, fighting.

Secondary sources of distress are persistent frustration, conflict between shop and home, union and boss, etc., confusion and uncertainty as to policy, etc.

The supervisor (who also is a human being and subject to tensions that affect his actions and judgments) may ignore signs of stress until too late; may see and correct some; may recognize all of them and decide to do nothing because he doesn't know what to do.

Among steps recommended by Eliel are: seek to know stresses through reactions; don't ignore beefs; don't let personal element enter; get facts. Never make rules that can't be enforced; never take a strong stand on a weak position or recede from a right position, he warned.

The supervisor should try to cultivate cooperation, not mere submission; should regard evidences of individual apathy as danger signals; should try to guide, not wipe out,

Wright Webb Brennan Brillhart Johnson

aggressive tendencies. Aggression may tend to relieve stress and is not necessarily a sign of cussedness, he pointed out.

When it is necessary to impose discipline, don't rationalize and don't let it be a response to hate, he advised. Discipline is a device to insure the smooth operation of enterprise, he said, and management should try to get at causes before imposing it. And don't forget that there are also rewards, he added.

The supervisor, on his side, expects information and reasonable cooperation; wants his bosses to act on his suggestions or tell him why they don't. Otherwise, apathy sets in and he becomes a supernumerary rather than a leader. The demands on a supervisor would tax the brains and ingenuity of a superman, Eliel said. More

Colored water flows through tubes to show where earnings go. Hewlitt at right

is expected of him than of an executive. When he comes to the job, he probably has had years of technical experience, but no time for learning competence in social and human fields. "Don't expect him to learn catch as catch can," Eliel advised.

Information should be provided before, not after, the event, if possible and should be accurate and understandable, Eliel believes. Employers frequently tell about the big things but not the little things employees see every day.

Every person has a complex system of beliefs surrounding church, union, home, capitalism, socialism, etc., and the same person can hold inconsistent beliefs at the same time, Eliel pointed out. The more intense stress becomes, he reminded, the more intolerant people become of other belief systems. People under stress respond to radical doctrines more rapidly, since they may relieve temporarily feelings of frustration. Beliefs can be modified by relieving stress, but constant shifts in policy are worse than a consistently bad policy, he warned.

The kind of general economy we have in this country must be preserved if we possibly can do so, Eliel concluded. One way, he thinks, is to insure that justice is done, since justice is the basis of our concept. "If we can't have justice in our business relations, what chance have we to preserve the economy we cherish?" he asked.

Accounting

C. B. Bradshaw, Sponsor
J. F. Brennan, Chairman

Where it is necessary to use inventory and appraisal methods and where book costs and price indices may be used was told by A. K. MacNamara, PG and E, in a discussion of estimating reproduction cost with use of price trends. The latter method generally is satisfactory in establishing rental bases, as evidence in rates cases, for insurance purposes, financial reports and for tax purposes for reporting to the state board of equalization, he said. Even where inventory methods are required, he stressed, inventory usually could be restricted to certain classes of property and the method of trending could be employed to advantage for other classes which might include major units of recent construction readily identifiable as complete entities in cost records. He pointed to the advantage of using price trends as the most economical method of securing generally satisfactory reproduction costs at a minimum time and expense.

In a talk on depreciation reserves, Robert P. O'Brien, California Public Utilities Commission, gave a summary of problems on terminology and some of their solutions. Depreciation concepts indicated in commission decisions over a 35-year period were outlined and in summarizing, O'Brien stated that, in proceedings involving rates, it can be expected that the staff will urge the commission to note that: (1) reserves should reflect annual charges based on cost of surviving plant devoted to customer service; (2) interest rate where sinking fund reserves are used should reflect realistically employment of reserve accumulation; (3) annual charges should be based in so far as possible on analysis of actual conditions; (4) reserves should be segregated in sufficient detail to facilitate controls and other cost analyses; (5) periodic reserve requirement estimates should be developed as reserve controls; (6) reserve adjustments should be made only in light of all facts and so as to protect the interest of rate payers who have made the depreciation provisions.

Difficulties in changing to a net investment rate base in jurisdictions such as those in the California PUC because of problems involved in changing from sinking fund to straight-line depreciation methods were explained by Norman F. Brown, So. Calif. Ed., who indicated that use of modified sinking fund method did not entirely eliminate the problem. It may be possible or even advantageous later to abandon the sinking fund method, he stated, but the change to net investment rate base should be gradual. He emphasized that the rate base and rate of return are only a means to the end of determining sufficiency of earnings. In the final analysis, the financial requirement of the individual utility is the test, he said.

Clarence S. Vieten, Calif. Elec. Power, listed circumstances causing damage or necessitating relocation of utility property and methods of determining damages under different circumstances. He emphasized the need for more uniform billing on damages since, in many cases, damage occurs to jointly owned facilities, and different methods may delay settlement.

Personnel

C. H. Warner, Sponsor

H. B. Rountree put his audience in the position of a job review committee, presented each with the standard questionnaire; picked a lineman as a typical employee for whom to establish a fair job rating. Explaining briefly the relative weights of the 12 factors making up the basic elements of any job and using a visible chart to plot progress, he determined the group evaluation of the lineman's job as regards each factor. This demonstration showed one company's meth-

od of making understandable to line supervisors what so often is dismissed as mere theory.

With the help of slides, R. E. Johnson, G-E, Los Angeles, presented a rating sheet form developed in the company's Pacific district for all except hourly rated employees. This sheet covers eight basic components of performance keyed to a written definition of "standard" and various degrees above and below that benchmark. It also gives a summary of performance on the job, capacity for growth, value currently as compared with the previous year, and general comments on characteristics helpful or detrimental to progress and data as to employee adjustment to job and community. Johnson reviewed typical profiles of completed rating sheets and the discussion with the employee concerned. The program of rating and review has been constructive both for those rated and those doing the rating, Johnson declared.

Credit and Collections

K. L. Boosey, Sponsor

Company earnings and where they go were shown cleverly on an animated board prepared by Clarence Hewlitt, PG and E, to liven the credit and collection section of the employee education course, "Know Your Company."

In giving the demonstration to employees, Hewlitt points out that the company hires dollars as well as people and must pay wages for them; ties in with collections by reminding that bills must be collected in order that operating expenses may be paid.

While the number of business failures is not increasing, the size is, materially, Ed Wright, San Diego G&E, reported following a study of bankruptcy which indicated a further increase in dollar average after the first of the year.

Pointing out that there is no such animal practically as bankruptcy for benefit of creditors, he outlined the advantages of assigning commercial accounts to the Board of Trade for collection. During the past few years, anybody could run a business, he pointed out, but now, when it is necessary to get out and sell, inexperience is getting owners into trouble. Proper management may put such a business on a paying basis and keep a good customer, he said. Policy of utilities in this and effect on public relations proved to be of particular interest to the group and, since time did not permit full discussion, it was decided to reopen the subject at a future meeting.

Generally speaking, best results in collecting third-party claims are from prompt and comprehensive investigation and presentation of the bill in a friendly manner, according to N. E. Carroll, So. Calif. Ed., who discussed the many problems of pressing a claim against an outsider, often a customer. Carroll suggests a preliminary notice of intention to make claim, which may bring more information and gives the other person an opportunity to present his side of the question. Reluctance to recognize liability, tendency to exaggerate or create defenses, tendency of employee to present case in favorable light to his organization were among the human qualities adding to the difficulty of determining the facts. Danger of prejudicing community relations must, of course, be balanced against the monetary claim, it was pointed out, and a compromise may sometimes prove the best course.

Bradshaw Warner

Carroll Boosey

Beyrer Ruth

The mechanics of letter writing can be simple if one remembers that the writer starts to talk as soon as the letter is opened, according to H. Price Webb, California State Department of Education, who warned against getting tied up in knots with high-powered phrases. Goals of collection letters are to get the money and maintain customer good will. To do this, think first, then dictate, Webb advised. Know who the person is, visualize him, if you can; then maintain the *you* point of view, he urged. Analyze why the bill hasn't been paid (people may be careless, plain cussed or financially embarrassed) then decide on the best appeal. But, he warned, let them know what you want done and when, and do it in short, simple terms and in a warm, friendly manner.

Purchasing and Stores

W. F. Ruth, Sponsor

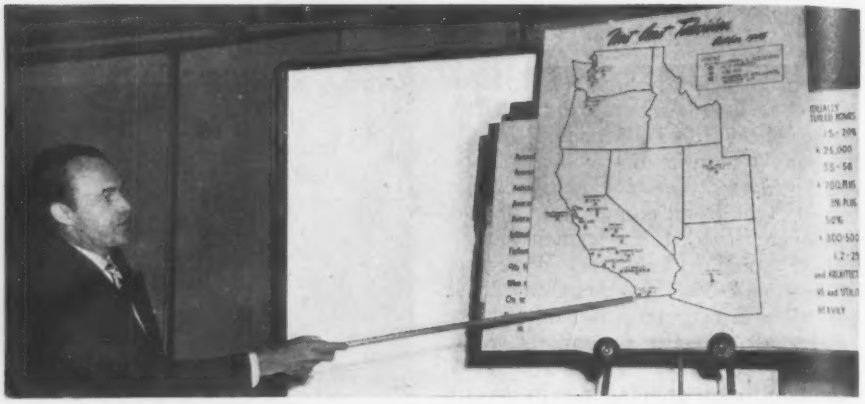
That just about all traffic matters have a direct influence on transportation costs of materials purchased was brought out by H. J. Letts, So. Calif. Ed. In the past two years, freight rates have been increased approximately 44%, he said, and carriers have applied to the Interstate Commerce Commission for an additional 13%, which, if allowed, will add an estimated $1,092,000,000 to shipping costs next year. Rates for other methods of transportation have increased on a nearly comparable basis. These increases must be passed on to the customer, increasing the delivered cost of goods to a point where transportation must be given serious consideration, he declared. Cost of transportation to the buyer is contingent upon the f.o.b. point terms on which the materials are purchased, he pointed out, and those points should be clearly designated on purchase orders or in contracts. Loss from damage caused by improper packing and cost of presenting claims is another expense, especially when the damaged shipment is urgently needed and replacement parts cannot be secured locally. Manufacturers representatives took part in the discussion of packaging, loading and bracing of material.

In discussing accounting for containers, W. E. Beyrer, San Diego G&E, described a record maintained on receipts, issues and returns of drums and reels. He advised that a company number, embossed on metal, be attached to all reels when received. He also recommended that the purchase

order number be placed on a similar tag and nailed to the reel. A card record is then maintained as the identifying record for all reels received, issued to jobs, returned from jobs and returned to vendors. This record also shows purchasing order data, name of vendor, manufacturers serial number and invoice number. It was suggested that there would be considerable saving in handling of containers, as well as a decrease in inventory, if some system could be devised to amortize the cost on an equitable basis between vendor and purchaser.

If the purchaser can save time and effort for the supplier, the supplier's expense and cost will be reduced and a good share of these savings will be passed on to the purchaser in lower prices, better engineering service, and other services and even better shipment, Charles Holland, G-E, told the group in presenting the manufacturer's viewpoint on utility purchases. Under routine handling of quotations and orders, it was suggested that the buyer indicate when bids are desired; have some sort of blanket agreement with regular suppliers regarding terms and conditions of sale; give a functional specification and permit the manufacturer to work out the details; avoid super-rush orders; expedite orders only where necessary, give full information, never expedite through two or more channels. Notification to unsuccessful bidders of results of negotiations not only is a courtesy but a benefit to both supplier and buyer since the supplier who is given honest reasons for his failure to secure an order has an opportunity to correct the deficiency.

In Holland's opinion, only one thing should dictate to the purchaser where his business should be placed—getting the greatest value for the dollar spent. In deciding who can give this, several manufacturers should be considered initially, he believes. Engineering quality, ability to service, experience of the manufacturing organization,



Caldwell

contributions to the industry as a whole—all are considerations. In purchasing on a repetitive basis, orders tend to be too small and to be placed too late, he pointed out. By placing larger orders, increased inventory cost might be more than saved by reduction in purchasing and restocking expense. Availability of certain repetitive items should be discussed frequently with suppliers so that policy can be varied where necessary.

Business Development

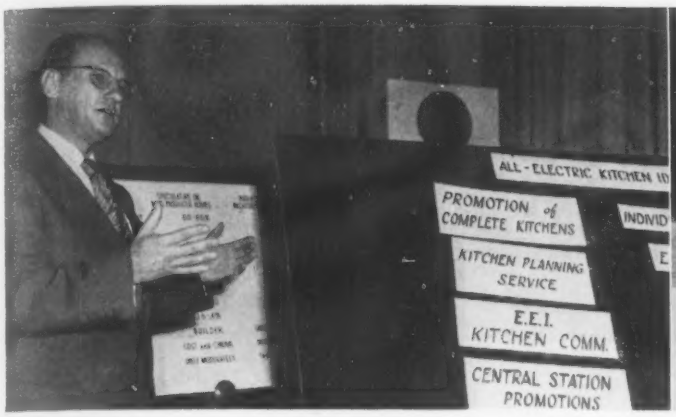
J. S. C. Ross, Chairman
C. L. Moore, Vice-Chairman

INSPIRED by the morning's general session in which they were given an encouraging view of the potentials of electric power and electrical manufacturing in the Western states, members of the Business Development Section of PCEA started Thursday afternoon on a two-session program arranged to give them fifteen speakers in six hours. Under the direction of J.S.C. Ross, section chairman, with the assistance of C. L. Moore, vice-chairman, and the electrical living committee chairman, E. W. Meise, speakers on the many subjects now interesting the load-building and the equipment-selling members of the industry were kept to their schedules through the use of the colored light warning systems long in use at San Diego association meetings.

With few exceptions, speakers were the chairmen of the committees designated by the section to handle the special problems. Leading off was T. W. Christensen, chairman of the handbook revision committee, who reported on the success of the PCEA's Agricultural Power Handbook, which was last revised in 1939. He said that requests for the handbook now were coming from every section of the world. Looking to the future, Christensen said that there is twice the present electric load available in rural areas. It awaits the industry's efforts to sell the farmer on the use of yard lighting, water heating and sterilization, poultry uses, dehydration, hay drying, and many other new uses of electricity that are becoming available for rural areas. He was followed by H. Wayne Stone of PG and E, who reported on the extent of rural electrification in the San Joaquin Valley. He showed how the area had been changed from the 1898 system of hand and animal labor farming to the mass production of the present day through the impetus of the deep-well turbine pump which solved the water problem. In 1920, he said, there were 9,800 irrigation pumps in that valley, in 1940 there were 27,600, and by the end of 1948 there will be about 37,000. Stone reported that 3,790 miles of rural electric lines had been built in the San Joaquin Valley during 1947.

The chairman of the PCEA's LP gas committee, R. I. Mendes, reported on the group's efforts to keep the association up to date on the status of the bottled gas competition, and said that encouraging signs were now being noticed. He pointed out that the retail prices of LP gas have increased 25% during the last nine months, and

Moore Ross Stone Christensen Raymond Mendes



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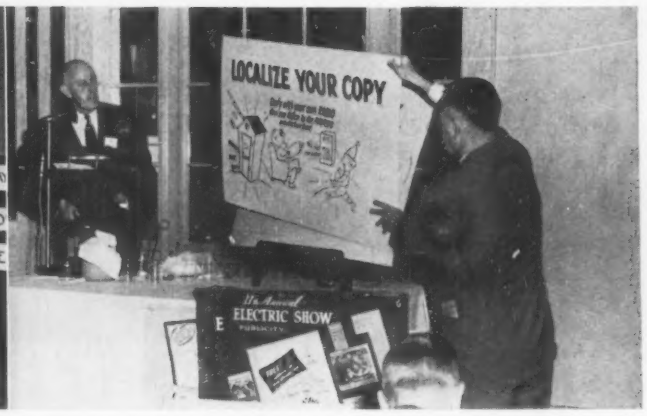

Raymond Moore

that there is evidence of intensive competition between merchandisers of the gas. Nevertheless, Mendes reported, LP remains a definite and direct challenge to the electrical industry and that there must be a continued effort to study the situation, to plan effective competitive action, and to carry out this action.

Mendes introduced a guest speaker, Howard A. Oliphant of the General Electric Co., who showed that comparative studies of LP and electricity have provided the electrical industry with sales ammunition. He outlined in detail the studies made in the parallel test kitchens at G-E in Bridgeport, and presented folders which made the results available to everyone in the industry. Assorted figures from Oliphant's report showed that these results came from the test kitchens—the temperature of the electric kitchen remained 8 to 16° cooler than the one with the bottled gas stove—the LP kitchen had a humidity from 11 to 200% higher than the electric-equipped kitchen, mostly because 1,000 cu. ft. of propane gives off 23 gal. of water during combustion, butane gives off 28½ gal. of water per 1,000 cu. ft. of gas—there is a saving of time with electric cooking, too, the tests showed.

Utility Advertising Needed

F. M. (Frosty) Raymond of the San Diego Gas & Electric Co. gave a detailed and well-received study on why the electric utility should advertise and why it should do it now in spite of the problems of meeting present-day load requirements.

He prefaced his discussion with a quotation from the conference in which his company decided to increase its 1948-49 advertising and promotion budget at a time when 4,000 families were still waiting for electric service in San Diego. According to Raymond, a company vice-president (A. E. Holloway) said "The building of load for a gas and electric utility is different from the promotional efforts of a department store or grocery. Ninety per cent of our selling efforts are not expected to produce results tomorrow or next week—maybe not for several months. Our advertising job is long range in its character. It costs money to utilize to the fullest extent the better living provided by modern gas and electric equipment. The seeds of desire must be planted continuously, recognizing no seasons, neither for planting nor for harvest. It takes time for those seeds to break through the soil and grow into the down payment or purchase price of a refrigerator, range, home freezer, or television receiver . . ."

Raymond analyzed the reasons why a utility should advertise now as: (1) long-range load building; (2) helping the retailers sell appliances and electrical equipment, also better lighting and better living for the home, farm and factory; (3) to keep stockholders interested in the utility; (4) to forestall rate increases; (5) to beat outside competition for the consumer dollar; (6) to help fill the valleys in load curves; (7) and generally to stay in business. Many illustrations from the current campaign being sponsored by San Diego Gas & Electric, through the Bureau of Radio & Electrical Appliances, were used by Raymond to show how these advertising objectives could be reached.

From outside the industry, the Business Development Section brought Gene Burke, an industrial engineer, for a talk on "Modern Store Lighting." He told the group that there are 4,000,000 retail establishments in the country which need modernized lighting. In filling these needs for better lighting, Burke suggested that a combination of hot or cold cathode with incandescent is proving most effective. But, he said, lighting must be tailored to the type of store and to the product that is being sold — brilliant blue-white light is best for jewelry stores, for example, but more yellow light is effective in selling furniture. He recommended the use of "zone lighting" in retail establishments, with the spot-lighting of special items. Among store lighting trends, he said, is one toward the use of lights in the rear of showcases, spots above showcases, the use of ceiling patterns in which light and color are used, and the use of special lighting to help increase sales in those stores which feature self-service.

Closing the first session was the presentation of a motion picture on *Modern Materials Handling* produced by the General Electric Co. W. O. Kyte of G-E presented the movie and added a discussion of the very complete studies on materials handling which has been made by his company and incorporated in an illustrated booklet.

Electrical Living Report

Because manufacturers have increased greatly their facilities for producing electrical goods, and because we are approaching rapidly the time when the wartime backlog will be satisfied, the electrical industry faces a period when only the intensive selling efforts of the appliance retailer can keep volume at a profitable level, according to E. W. Meise, chairman of PCEA's electrical living committee, who struck the keynote for the second and final session. Before turning the meeting over to the seven speakers, he emphasized that the object of the committee was to find out what the utilities, manufacturers and distributors can do to help the appliances retailers develop active and successful retail selling organizations.

The various committee chairmen and other speakers in this session, attacked this problem both from the analysis of markets and the sales approach on specific problems. Leading

off was W. H. Thompson, Westinghouse Lamp Division, and chairman of the home lighting committee. Only a small majority of the millions of new home owners are getting adequate lighting, said Thompson. He showed from PCEA surveys that in the mass-produced homes being built on the West Coast, representing about 80% of all home construction here, that the value of the built-in lighting fixtures totaled between $20 and $50—roughly between .16 and .4% of the cost of the home. At the same time, individually architectured homes were spending an average of $300 to $500 for built-in fixtures—between 1.2 and 2% of the home cost. Yet neither of these types of homes was approaching the point where they could be considered to have well-coordinated and well-planned lighting, he reported.

Said Thompson: "Our goals should be to provide the building public with the best possible lighting information and equipment available from as many reliable sources as possible. Before we may directly educate Mr. and Mrs. John Doe, we must break down quite thoroughly the walls of ignorance that surround them. We must convince the professional and sales people in our industry — the dealers, salesmen, contractors, architects and builders — whose job it is to aid and serve the home owner, that 'planned lighting' provides many great advantages for their customers . . ."

For the adequate wiring committee, J. H. Adams, chairman, presented an outline of its suggestions for a program that would be sound and broad and which could be tied in with every company's regular advertising and promotional effort. The program included: advertising within the industry to remind them that adequate wiring insignia should be included in all consumer advertising, and that cuts, layouts, copy, are available for inclusion in regular advertising programs; publicity programs including truck posters, window display banners, telephone directory cuts, and releases to the home magazines; educational meetings, in which slides and scripts available from the national office of the Adequate Wiring Bureau are used for both industry and consumer meetings; an electrical contractor program in which the rest of the industry tries to assist those contractors, who in spite of the bad effects of the curbstoners, are trying to increase the quality and adequacy of their customers' lighting and wiring jobs; education booklets, including *Electricity in Your Home Plans* and *The Private Life of Your Home*, to selected prospects, and handouts such as *Make Sure the Wiring Will Measure Up to the House* which is being used today by Southern California Edison, the City of Riverside and PG and E, which gives the home builder a graphic story of the advantages of adequate wiring.

Jenkins Beardsley

Bruce Zitlau

Television on the West Coast

Under the direction of Henry Rice, Southern California Edison, chairman of the association's television committee, a program was scheduled to show the results of television in Los Angeles up to the moment and to project television to the rest of the Western states through the talk of P. G. Caldwell, chief engineer, American Broadcasting Co., West Coast operations. Because of the shortage of time, Rice's report on television in Los Angeles was omitted, but will be presented in the next issue of ELECTRICAL WEST. Caldwell presented a dramatic picture of television on the West Coast, its progress and its problems. He saw 1953 as the first year in which the Pacific Coast states could be linked to the East in a television network. He startled the audience with the fact that 30% of the population of the U.S. now is in areas where television can be received, and that with the addition of stations now under construction, more than 45% will be able to receive television in their homes.

Television faces problems not inherent in radio, he said. Transmission requires two transmitters, one for picture, one for sound, plus two synchronizers. The limitation on distance, forced through the necessity for using ultra short waves, requires a high location for transmitters. The ultra short waves needed for the very wide television bands, bring problems in reflection of signal and the resulting "ghosts" on the picture screens.

William W. Bell of Westinghouse Electric Supply Corp. presented an up-to-date analysis of the market for home laundry equipment. He said that the successful, volume sales of automatic washers, dryers and ironers requires demonstration facilities in the dealers stores and the ability to have each appliance demonstrated again in the purchaser's home.

In the same vein and following Bell, was a talk by E. B. Barnes, Kelvinator, L.A. and chairman of the modern kitchen committee, who presented the program for promoting sales of all-electric kitchen ensembles. He emphasized to the group that the electric kitchen held a unique position in the industry because it was: (1) a load builder for the utility; (2) a profit builder for the dealer; and (3) for the manufacturer, a central point on which to hang the promotion for several appliances. He suggested that the association consider the direct promotion of electric kitchens, the further development of kitchen planning services, cooperation with the EEI kitchen committee, and extensive promotion of complete kitchens through the utilities.

Home Economists Program

Reporting on the past year's activities of the PCEA's home economists committee, of which she is the chairman, Marguerite Fenner, PG and E, said that the success of the two sessions, one in San Francisco and one in Los Angeles, held for home economists from power companies, manufacturers and distributors during the last year, has warranted an extension of this training for next year. She said that the plans for 1949 call for an electrical living institute course to be held in San Francisco. To this series of meetings, one a week for eight or nine weeks, will be invited the home economists of business firms, teachers of home economics in public schools and colleges, writers on food and home building for the press and radio, architects, builders, and contractors.

The program to be covered in these sessions, said Miss Fenner, will include the preparing of the home for modern electrical living, home lighting, the electric kitchen in the home and school, food preparation through the use of electrical equipment, home laundering with the

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washer, dryer and ironer, and the use of disposals, vacuums, electric heating equipment, etc.

Operating Economics

D. R. Jenkins, Chairman

Well-attended meetings of the eight committees of the Operating Economics Section seemed to radiate with a more than usual serious determination to delve into industry problems and find solutions. So intent was the steam group that even an evening dinner meeting was held. This year several of the group meetings were graced with the presence of a member of the Board of Directors of PCEA under a new board policy of sitting in with the "proletariat." Their presence and comments were most welcome. Meeting arrangements were a little different this year in that most of the eight committees of the section met jointly at a Friday morning general session to hear leaders discuss modern methods of system operation and dispatching.

W. E. Montgomery, So. Calif. Ed., said that the first requirements of good dispatching are good communication and a good system diagram at the dispatching center. He pointed out the advantages of decentralized control through use of switching centers, as practiced by his company. They not only lend flexibility to system operation but also serve to help in training operators. Men can be started at the smaller and simpler stations and then advanced on up to the larger and more complicated centers to supply properly trained personnel for system dispatchers. He noted an important change that has taken place in dispatching. Dispatchers now concern themselves as much with the flow and dispatching of kilovars as they do with kilowatts. Power factor meters have disappeared from switchboards and, in their place, var meters are now to be found. Better cooperation with the construction department in scheduling outages was stressed as an important factor contributing to better generation and operation.

Philosophy of operation of the system of the San Diego Gas & Electric Co. was presented by J. F. Sinnott. His company favors supervisory control of substations and decentralized control as against automatic substation operation. The system has two dispatching centers at present. Telemetering, carefully designed dispatching boards and every other modern dispatching tool has been provided at these centers. For locating and analyzing transient faults, the company has used a portable automatic oscillograph with excellent results. This is housed in a weatherproof cabinet and can easily be moved from station to station or even be located out on a line. Sinnott feels that there is entirely too much red tape in clearing equipment for relay testing. He showed how this could increase cost of relay testing as much as 200%. He feels that there is a happy medium between the present involved and time-consuming back and forth telephoning between dispatcher and tester and the other extreme of letting the tester go ahead without even notifying the dispatcher.

I. W. Collins, speaking for PG and E, said the three primary aims in dispatching are safety, service and economy. Voltage control is a major problem, he said, particularly during light loads. One of two parallel lines is often dropped to reduce charging current. In addition to large capacity installed in synchronous condensers the system also has 400,000 kva. in static capacitors. Its use of high-speed reclosing is to combat lightning and other faults. In addition, he said, PG and E is considering going to single-pole high-speed reclosing to improve stability under transient fault conditions. Speaking on the power outlook, Collins said that, barring any unforeseen difficulties, all loads will be met this winter. Daylight saving time is reducing peak by 365,000 kw. on the Southwest Power Pool by shifting part of the afternoon peak to the morning. This reduction is on a total pool peak of approximately five million kilowatts. Fast time has kept morning and evening peaks within 125,000 kw. of each other. However, its effect on energy use is insignificant.

A resume of the various group meetings follows:

Substation Group

A. A. Straub, Sponsor

Modernization of high-voltage circuit breakers was the topic of discussion of the substation group in its afternoon session before meeting jointly with the communications group. Increased interrupting requirements due to system capacity growth is responsible for present modernization programs. Southern California Edison Co. is rebuilding 89 of its 220-kv. breakers. Modernization includes new high-speed mechanism and arc quenching contacts. Slides showing recent developments and improvements in design of arc quenching equipment were presented. Improvements have resulted in interrupting capacity increase from 2.5 million kva. to 10 million kva. Contacts only are changed to increase interrupting capacity from 2.5 to 3.5 million kva. J. H. Dorsey, So. Calif. Ed., presented slides showing equipment used for testing modernized breakers to make sure desired results were obtained. D. J. Marsden, Westinghouse, and G. E. Cain, General Electric, also contributed to the discussion. Requirements and results are about the same for both companies and approximately equal results are obtained with respect to speed and interrupting capacity.

A joint session with the communication group was devoted to installation and operation of utility radio communication. Facilities and experience of both PG and E and Southern California Edison were discussed. PG and E now has 17 transmitters and 250 mobile units; Edison 28 transmitters and 240 mobile units. Usage covers a wide range all the way from dispatching trouble calls to handling of meter and service orders, laying

Corwin Crawford Preizner Hunt

submarine cable and sagging-in transmission conductors. Experience with walkie-talkies has shown that for most uses the standard mobile unit is preferable. R. L. Brinton and C. R. Nickerl, speaking for the two companies respectively, also reviewed the problems and procedures of licensing of radio installations, the methods of conducting coverage surveys and the installation and operation of equipment.

Transmission and Distribution
W. R. Gielow, Sponsor

History of the development of the so-called "low cost" underground systems installed in the San Francisco Bay area by PG and E from 1935 to the present time, was presented by B. L. Peter. These systems have been installed in new subdivisions in lieu of overhead pole line construction, the subdivider paying the difference in cost. Construction in most cases consists of both primary and secondary cables buried directly in the ground. Transformers are either located in a protective enclosure above ground or partly below the ground level. Costs, compared to an equivalent overhead system, vary from about two to one up to five to one, resulting in a cost to the subscriber of from $60 to $200 per lot. The utility aims to provide an installation at least cost to the subdivider and which at the same time will be satisfactory from the operating and maintenance viewpoint.

H. E. Jung, So. Calif. Ed., described construction and engineering details of a new 18-kv. low-pressure gas-filled cable which his company has installed to the summit of Mt. Wilson, the cable extending from about 2,300 ft. elevation to more than 6,000 ft. Increased loads at and near the summit necessitated installation of additional capacity to supply these loads. Difficult terrain and severe exposure to ice, snow, and winds made advisable the use of a buried cable. Problems encountered and methods used to solve them were of interest to all.

N. K. Yarnell, So. Calif. Ed., described and showed excellent pictures of several lines built by Edison in mountain areas using trees instead of poles as the support for the lines. Lines described were open-wire 4 kv. and 12 kv., also 4-kv. self-supporting cable. This construction provides facilities at considerably less cost than a standard pole line, both through the elimination of practically all poles and elimination of much clearing and trimming. Some of these tree lines have been operating for a number of years with maintenance costs not appreciably above costs of an equivalent pole line.

G. L. Hill, PG and E, discussed problems involved in the operation of standard 12-kv. line switches when de-energizing lines to which banks of static capacitors are installed. Tests are not complete, and it is not yet possible to make positive recommendations as to how the problem should be solved. Along with his talk he showed excellent high-speed color movies of some of the tests, showing the difficulties which are encountered.

Communications Group
R. H. Miller, Sponsor

Discussion in this group developed the fact that radio interference work has presented a considerable problem, and will require new techniques in its location and suppression. It was also developed that there has been little standardization in either equipment for this work as in methods of locating and curing such interference. Consequently it is planned that considerable emphasis will be placed on this topic at the next meeting. Microwave radio links were also discussed as a new tool for the use of the power industry for telemetering, supervisory control and voice communications. As this is an entirely new field, techniques for installation, operation and maintenance of such equipment will have to be developed and this field will be covered more in detail at future meetings. Other topics considered as needing further discussion were maintenance of power line carrier equipment, coordination of frequency assignments of power line carrier equipment for minimum interchannel interference and inductive interference with telephone systems.

After completion of this discussion, a joint session was held with the substation group.

Safety Group
E. C. Hunt, Sponsor

This group, well aware of its obligations to the people of the industry and having a desire to meet the problems of the future, went into session with a near 100% representation from member utilities. Previous committee activity and correspondence has borne news of the constant increase in the accident rate. This increase was, and will be, the uppermost topic until ways and means are found to bring about a reduction in the number of accidents. It was the consensus that our equipment, tools, methods and procedures are not the major causes but that we have failed in our method of selling. Our salesmanship program must be revamped and a new approach found or a better way established to impress everyone that the job must be done the "safe way." One of the objectives of the safety committee has been the establishing of standard rules and regulations. Discussion on this subject brought about recommendations that

Stanley

Middleton Brinton Nickerl Miller

a Rule Book should be of a loose-leaf type in order that it may be kept up to date, that certain sections of rules and regulations could be supplied to the employees on the subject material in which they were most interested. In other words, due to the multiplicity of operations in any group, a gas department employee would not receive the many rules and regulations that were formulated for the electric department employee, and vice versa. Consideration of the size met with considerable comment, with the divided opinion, one group for a letter-size rule book and another group for an intermediate size of approximately 4 x 6. Further discussion involved the scope of rules and regulations and more details will be forthcoming. It is recommended that intercommittee meetings be held in order that this group will be in a position to present to the operating men definite recommendations.

Meter Group
E. B. Kipp, Sponsor

Much of the time of the meter group was devoted to a discussion of the work of the Pacific Utilities' electric service requirements committee. This is an industry group working on problems of coordination and standardization of service entrance equipment and requirements. H. W. Bruce, L.A. Dept. of Water and Power, reported for the southern section which has been holding monthly meetings. Much progress has been made. Trend in the south is toward requiring the contractor to furnish and install meter sockets. Externally operated switch requirements are nearing completion and uniform data are being compiled and codified showing what the serving agency furnishes and installs and what the contractor furnishes and installs. Meter height over walks and driveways was agreed upon, as well as depth for recessed-type installations. Other standards cover safety socket boxes, safety blocks, test switches, and some characteristics of transformer boxes.

T. R. Bettersworth, PG and E, reported for the northern section of PUESR. A total of 18 serving agencies was invited to attend the first meeting. Seventeen men representing ten agencies attended. Two others have indicated that they will attend future meetings, thus assuring success in forming a northern California section. Questions put on the agenda for future discussion were: coordination of activities with southern California; 480-volt sequence; current transformer can sizes; test blocks with socket meters; service entrance cable types; service to multiple-occupancy buildings, and spacing of group meter installations.

Considerable discussion on PUESR ensued. Possible conflict with work of the EEI meter committee was mentioned. It was pointed out, however, that PUESR is a service requirements committee and does not consider meters themselves. It was agreed that such an organization is badly needed but that it should go slow in making local changes since special work results in unduly increased costs.

Reports on meter schools indicated that three will be held during the coming winter and spring. One will be held at the University of California at Berkeley, one in southern California, likely at California Institute of Technology, and one in Arizona at the University of Arizona. Utilities in the areas will participate by paying the cost of sending a number of their metermen.

Considerable time was given to reports from manufacturers on new developments. Duncan, G-E, Westinghouse and Sangamo, all had a number of new devices or improvements to report.

Hydro Group
C. G. Crawford, Sponsor

Design and Operation of Valves and Slide Gates for Penstock Protection in Event of Penstock Failure, was the subject of papers by T. J. Corwin, PG and E, and A. C. Werden, So. Calif. Ed.

Both discussions were for valves located at the top of penstocks wherein either automatic or semiautomatic control is used to bring about the valve closure in the event of penstock failure so that minimum damage to associated equipment will result. Corwin established a classification for different types of installations, namely: (1) header box, (2) forebay, and (3) pressure tunnel. Cylindrical gates, slide gates, radial gates, etc., were placed in the first two classifications and butterfly valves only in the last classification. Comments by Werden were devoted, primarily, to butterfly valve installations between pressure tunnels and the penstocks. The importance of valve design from both the reliability and loss of head standpoint was clearly brought out. As an example, only three emergency closures have been required in 35 years of operation with fourteen valves on the Big Creek System; however, under such conditions, the valve *must close,* while under normal operation the valve must have minimum head loss.

Both speakers discussed the many different types of control required to suit different installations. As in so many cases of hydraulic problems, no two installations seem to have the same control requirements.

In general PG and E favored hy-

draulic stored power for bringing about closure while So. Calif. Ed. favored electric power with standby auxiliary emergency equipment available. Discussions were presented by manufacturers giving design information together with slides showing photographs of valves at shop assembly and schematic operating diagrams. A. C. Longley represented Allis Chalmers; Ross L. Mahon, S. Morgan Smith; George F. Gayer, Westinghouse, and I. M. White, the Pelton Water Wheel Co. The meeting was concluded by a very active discussion principally on types of control which brought out several ideas for thought such as differential flow control between top and bottom of the penstock and control by measuring leakage along the penstock.

Transportation Group
C. H. Rhudy, Sponsor

In discussing rim widths, C. R. Stanley, PG and E, found that wide base rims appear to give better service but stated that, due to lack of sufficient experience, he was unable at this time to furnish conclusive figures. However, flat tires due to pinched tubes, etc., occur less often. He felt that tire pressure should be adjusted to the load carried and that higher speeds tended to produce excessive tire wear. He suggested that, on the heavier loads, speed should be checked carefully. New low-pressure tires were also found to be noisier and tended to stonebruise more than the standard tires. R. M. Middleton, San Diego G&E, discussed operation of multidrive vehicles versus standard two-wheel drive equipment. His company uses power wagons only to supplement operation of heavy line trucks in more difficult terrain, but he feels that multidrive units have a definite place in their operation. It was brought out by other members that power wagons were in use quite extensively for purposes other than line construction, such as patrol work in diffcult country.

F. C. Hall of the American Coach and Body Co. discussed pulling of poles by winch trucks. He stated that winch cables should be the governing safety factor and that this type of truck should be equipped with cable strength below the capacity of the engine, winch, and other power or drive applications. It was his opinion that trucks should be built to take care of the ordinary jobs, but for the out of ordinary heavy pulling, it was more economical to hire rigging for these jobs.

Ellis Templin, Los Angeles Department of Water & Power, told of his newly developed pole puller which works on a hydraulic principle. This equipment is capable of producing 50,000 lb. pull. The pressure exerted is on the ground about twelve or fifteen inches from the base of the pole and does not tend to pack the ground, making it more difficult to pull the pole. He also spoke of moving heavy equipment such as rotors, transformers, and so forth, by the use of reinforced low-bed trailers. He encountered many difficulties in load distribution. He also suggested use of outrigger wheels to increase capacity. C. E. Ellis described a new street light ladder developed to care for new highway lighting regulations. This ladder reaches a maximum of 37 ft. 6 in. working height and is adjustable through a full circle. It is operated manually by gears to rotate, elevate, and extend the ladder. It also has a safety device that will not permit the truck to move when the ladder is off of the carrying position. He also told of the many uses that are made of Hysters in store yard to load, unload poles, crossarms, transformers, and miscellaneous line material, as well as lifting heavy parts such as motors and so forth, in garage operations. W. H. Brown told of problems in over-the-highway moving of large loads.

The following subjects were suggested for discussion at the next meeting: 1. Legislative measures; turning signals; weight legislation; stopping distances and loading security; fifth wheel and trailer hitches. 2. Housing, shops, garages, and stores; 3. Operation of low-bed truck chassis for line construction, and the advantages and disadvantages of straddle trucks. 4. Transmission line 3-wire stringing units. 5. Operating costs. 6. Functional budget operation and machine bookkeeping. 7. Round-table discussion.

Steam Group
W. A. Zitlau, Sponsor

Refractories, plastic and castable vs. molded, was the subject of discussion by C. A. Cryster, Plibrico Co. His remarks covered an outline of the fundamental refractory needs by utilities. It was pointed out that plastics and castables could be used to advantage in all types of installations. W. B. Hill of the Charles C. Moore Co. then continued the development of thought along the line of plastic and molded refractories. Products developed by the Babcock & Wilcox Co. were described and alternate methods at erection discussed. Lynch, C. C. Moore Co., exhibited samples of B&W castables removed from installations in Longview, Wash., and Bakersfield, Calif. Fred C. Sammons of the General Refractories Corp. concluded the talks on refractories by pointing out the importance of designing the material to suit the job and warning operators against attempting to formulate castables and plastics on the job. Materials should be purchased from a reputable manufacturer.

Opening the second phase of the meeting, R. A. Bannister, Kern steam plant, PG and E, presented a discussion on difficulties experienced in recent start-up of new plants or units. Bannister cited several failures on new equipment and systems but drew the general conclusion that the rush to get new units on the line to meet growing load demands was responsible for most of the difficulty. M. L. Crater, City of Glendale, continued discussion along the same line with remarks on the latest unit installed by the City of Glendale. E. J. Huskinson of the Central Arizona Light & Power Co. cited troubles experienced with his latest machine and W. T. Hotchkiss, So. Calif. Ed., continued the discussion with remarks on the Redondo steam station. W. A. Zitlau, San Diego Gas & Electric Co., concluded the remarks on new station starting difficulties, with a brief discussion of problems encountered at Silvergate station in San Diego.

At a dinner meeting the third phase of discussion was opened by introduction of V. F. Estcourt, PG and E, who spoke on how we train operating men. The subject was broadened and discussion amplified in turn by E. J. Huskinson, Central Arizona Light & Power; Otto Hedrick, City of Glendale; John Bruce, So. Calif. Ed.; M. L. Crum, PG and E; and W. A. Zitlau, San Diego G&E. Highlighting the evening was a description by Weller Reed of the Hawaiian Electric Co. of training the island natives in power plant construction and operation.

● Clif Simpson, manager of National Electrical Retailers Assn., following the Los Angeles leadership conference, reported elsewhere in this issue, held a number of local meetings with NERA members in Fresno, Merced, Modesto, San Francisco, Salinas, San Diego, Long Beach, Pasadena, Inglewood, Burbank and an organization meeting in metropolitan Los Angeles. He then stopped at Denver for a meeting for members from Colorado and Wyoming called by NERA president, Herb Names of Denver.

● Radio promotion meeting was held late in October by the Intermountain Electrical Assn. in preparation for its big radio promotion which was staged Nov. 5-20. Support was given for the promotion by local radio stations plugging the use of radios in every room; local newspapers carried a special radio section; also used the National Radio Week tie-in.

Northwest Groups Plan 1949 Programs

ENGINEERING, Accounting, Business Development and Personnel sections of the Northwest Electric Light & Power Assn., held planning meetings in October and early November to set up the year's program and to plan their spring meetings.

Engineering

The Engineering & Operation Section with L. R. Gamble, Washington Water Power Co., chairman, met in Spokane in October and decided to hold the spring meeting of the section, April 6, 7 and 8, in Boise, Idaho. High spots of committee programs are as follows:

Electrical equipment committee will study the use of switched capacitor banks, unit substations vs. field assembled substations, and load break switches on feeders. This committee is headed by C. E. Cannon, Washington Water Power Co. Its two subcommittees, meters and services, with Ellis Van Atta, Pacific Power & Light Co., chairman, and electronics, headed by L. G. Walker, Idaho Power Co., will study meter obsolescence, demand metering, progress on supervisory control equipment and operating experience with telemetering.

C. H. Kirk, Montana Power Co., chairman of transmission and distribution committee, announced as part of his committee program, training school for linemen, rural line operation, series capacitors on distribution lines and street lighting practice.

Power production committee, with T. D. Ellis, Pacific Power & Light Co., chairman, will make a progress report on load molding and will hear of new hydro developments of the Idaho Power Co., and steam plant construction by Utah Power & Light Co.

The utilization committee, with R. C. Setterstrom, Montana Power Co., chairman, will concern itself with characteristics of the flash welding load, power factor correction on customer premises and other matters.

C. S. Alger, Puget Sound Power & Light Co., and his code committee will report proposed revisions of the NEC with particular reference to motor protection, and progress in the revision of the safety rules for outside construction in Washington. The latest developments in heat pumps will be brought up to date by the house heating research committee, of which O. L. LeFever, Pacific Power & Light Co., is chairman.

A feature of the Boise meeting will be a visit to the new hydroelectric construction under way by Idaho Power Co. on the Snake River, which, on completion, will have increased the generating capacity of company' system by one and one-half times since the close of the war.

Business Development

On Nov. 8 and 9, the Business Development Section met under the chairmanship of J. F. McAllister, Utah Power & Light Co. The section meeting next spring will go to Salt Lake City on May 9-11, which will present the opportunity for delegates to visit the open cut copper mine of Kennecott Copper Co. and the Geneva steel plant said to be a model in design and operation of such plants.

W. L. Thrailkill, Washington Water Power Co., president of the association, addressing the opening session, said that the recent election indicated fundamental changes were occurring in our government, politics and economics, and the industry should gear its operations accordingly. We have to sell all our people on the advantages of the American system as we know it, and believe in it, he said, so that our system does not swing too far from the fundamentals on which it was founded. This is not the responsibility of top management only but extends to all our organizations. Paul B. McKee, president, Pacific Power & Light Co., told the group at luncheon that, even though there is now no surplus power to sell, there is still vital need for sales departments to help carry public relations and educational programs so necessary to the health of the industry.

Thrailkill outlined a proposal that the advertising and publicity committee of the association organize for securing greater industry publicity in the area, using the association as a vehicle, and this committee later came in with a report on a program to be considered later by the executive committee of the association. Frank Swearingen, Puget Sound Power & Light Co., is chairman of this committee, which has been detached from the Business Development Section and given independent status to report to the president and executive committee.

Bureau and committee activities were broadly outlined and chairmen and vice-chairmen were selected. Electric home bureau, under R. E. Sinclair, Pacific Power & Light Co., chairman, will carry three committees, one on electric equipment, another on home service and a third on indoor climate. George Earl, Utah Power & Light Co., heads the committee on electric equipment for the home, which will give its attention to the all-electric kitchen, all-electric laundry, modern lighting and health appliances. Louise Gronnert, Pacific Power & Light Co., heads the home service techniques committee, which will approach the home service problem through mass selling methods other than through individual service. The part home service girls can play in dealer sales training classes will be explored. Indoor climate committee, with C. A. Manson, B. C. Electric Railway Co., chairman, will keep pace with new factual information on the heat pump and panel heating, and will emphasize summer cooling and ventilation.

J. C. Platt, of the J. C. Platt Co., manufacturer's agency in Seattle, heading the commercial and industrial bureau, set up four committees as follows: load molding, A. H. Greisser, Portland General Electric Co., chairman; planned lighting, K. E. Hollingsworth, Puget Sound Power & Light Co., chairman; cooking and heating, Homer Shaw, Utah Power & Light Co., chairman, and the data sheet committee with D. O. Bergey, Pacific Power & Light Co., chairman.

Rural and farm bureau, under Earl Olson, Idaho Power Co., chairman, will emphasize farm chemurgy, agricultural college activities, 4H and FFA activities, and manufacturer and jobber plans for distribution of appliances and equipment on farms. R. Hall, B. C. Electric Railway Co., chairman of the adequate wiring bureau, proposed a slogan contest among members of the industry in the Northwest to focus attention on the need for more wiring for better living. Last year's contest drew more than 300 entries and the aim of the bureau this year will be to increase this number materially through better publicizing of the contest and larger prizes.

The manufacturer-jobber-dealer-contractor bureau starts its second year under Walter Potter, lamp department, G-E Co., chairman, with a follow through on last year's proposal to set up small industry policy committees in the several trade areas in the territory, to serve as a clearing house for local industry problems.

Accounting

Meeting in Portland Nov. 5, the Accounting & Business Practice Section Executive Committee, agreed to hold the section meeting in Vancouver, B. C., June 23 and 24. Frank Copithorne, B. C. Electric Railway Co.,

chairman, announced a new departure in the form of this meeting in that he would make a tour of his company's accounting plant the basis for discussions of routines and procedures. Emphasis will be on machine accounting to bring out the latest practices in time and money saving methods. For the first time the section will plan separate concurrent meetings for general accounting people and customers' accounting.

Personnel

The Personnel Section met in Portland, Nov. 18, at the call of L. T. Matter, Puget Sound Power & Light Co., chairman. Decision was reached to hold the spring meeting of the section in Seattle, probably some time in May. Previous years' methods of operation with committee studies and reports will be abandoned this year in favor of a round-table conference encouraging more widespread discussion of a few major topics.

Accident prevention and safety committee, under Claude Haggard, California Oregon Power Co., chairman, will again be given a full day for its program. Accident investigation, distribution specifications and their effect on accident prevention, safety rules or safe working practices, and foremanship training in its relation to safety, will be the principle topics in the formal part of the program. In addition, the group will meet in the evening for informal discussion of techniques, practices, methods, and results of company safety programs.

One day is to be given over by the Personnel Section to exploration of training programs, including indoctrination, job training, and supervisory training. On another day of the meeting, many problems of personnel administration will be thrown into the hopper for round-table discussion. A. R. Leavitt, California Oregon Power Co., is section vice-chairman.

EMEA

Television programming problems were discussed by Dave Crandall, CBS, before the EMEA meeting in Los Angeles Oct. 20. He stressed that the ultimate in TV production must include the best know-how of the theater for performance, motion pictures for production and radio for transmission. The program was completed by Micro-Switch Corporation's colorful film *Uses Unlimited*. Members also witnessed a demonstration of a new hydraulically leveling safety ladder. The annual smoker of the EMEA was then held on Oct. 29 at Rodger Young auditorium, attended by 500 members and guests.

Dist. 6, NECA Reviews Changes

THAT its size has outgrown its staff and their ability to service the needs of its widely scattered members was the impression gained from a discussion of the National Electrical Contractors Assn. by the representatives of its District 6 chapters, meeting in San Francisco, Oct. 23-24, with Vice-President T. L. Rosenberg, Oakland contractor, presiding. The preconvention district meeting was called to consider a number of proposed changes in the by-laws of the NECA and to submit any recommendations for other changes. It also served to unify the West in the nomination of a district vice-president to succeed Rosenberg who decided not to continue the heavy task because of health.

After hearing reports of conditions in the areas of the Spokane, Seattle, Portland, Salt Lake City, San Francisco, San Diego, Northern and Southern California chapters from either chapter managers, officers or representatives discussion followed on district problems. It was agreed that field service since E. R. Cornish started had been more what chapters and members had desired for years. The amount of territory assigned to him, however, was so large—seven Western states—that it made an effective educational program difficult. One of the constitution changes considered was the division of the territory into more districts. Instead of six there would be ten districts (to conform to similar IBEW districts). District 6 voted to lop off Idaho, Montana and Utah to allow them to go into a new district with Colorado, Wyoming and New Mexico. It was said that new chapters are being formed in Montana and Idaho.

Criticism of NECA headquarters for its pro-labor attitude and its failure to support its chapters in labor disputes or in presenting of cases for its chapters before the Council of Industrial Relations for the Electrical Contracting Industry brought forth discussion as to the character of the Council and its deficiencies. The growing number of cases presented to the Council was told by Rosenberg, himself a member, and he said something would have to be done to do more of the arbitration of cases at a district level. In fact he advocated a Western office staffed with both a field representative and a labor relations man and will recommend that to NECA at the convention.

The resolution submitted by the Northern California Chapter, asking a review and clarification of NECA policy and executive administration was not supported by the district. (It was later entered independently by the chapter itself on previous vote of its board of directors.) Instead the district representatives voted two resolutions: (1) that NECA have a director of labor relations responsible to its national labor committee and not to the staff; (2) that full assistance be given contractors by NECA and its labor relations director in support of cases submitted to the council.

Approval was given to most of the proposed changes to the NECA constitution, which would give the board of governors its own chairman, shorten terms of office of national officers, widen the eligibility for office. But the district chapters opposed centralization of control of chapters in the headquarters, prizing their own local autonomy. They likewise opposed increase of minimum dues to $50 a year from $25, contending that higher dues would reduce membership and weaken the association, make it less representative of all contractors.

Another resolution passed asked for more definite qualifications for contestants for the NECA apprenticeship award. Candidate from District 6 for this year's award was Nicholas De Benedetto of Fresno.

Nominations for the district went to: J. B. Shamel, California Electric & Maintenance Co., Los Angeles, for vice-president and member of the administrative committee; E. L. Buttner, Scott-Buttner Co., Oakland, for member labor relations committee and member of Council of Industrial Relations; R. B. Lane, Industrial Electric Co., Seattle, District 6 member for the line construction section. J. D. O'Connor, Lupen & Hawley, Sacramento, was named floor leader for District 6 at the convention at Miami Beach, Nov. 28-Dec. 3. Spokane chapter invited the next district meeting in the spring to meet in that city.

Appliance Associations

The San Mateo County Gas & Electrical Appliance Assn. has been organized by 49 gas and appliance dealers in that area. Temporary officers are Fred Pelle of San Mateo, president; Wallace Blicht of San Carlos, vice-president; and Willard Hilton of Redwood City, secretary. The organizing committee consists of Joseph Ramos, San Bruno; Chris Olmo and Clare Kemp, Burlingame; Elmer Ross and Earl Scannel, San Mateo; Joseph Boudreau, Belmont; Wilbur Reifschneider, Redwood City.

Left to right: Edwin Fleischmann; James H. Turner, San Francisco; Commissioner Robert C. O'Brien; Dr. G. Vernon Bennett, Los Angeles councilman; J. H. McCambridge, Burbank; F. S. Miller, Palo Alto, all attending CMUA meet

CMUA Discusses Public Power, Economics, Engineering

THE picture on public power will not change materially under the new democratic administration, said southern California Congressman Norris Poulson, in speaking before the annual conference of the California Municipal Utilities Assn. which met at Santa Barbara, Nov. 17-19. The reason is that many conservative men will remain in office. He does not think any legislation will pass making it compulsory to sell federal power at the bus. There is a group in government who would like to control all power and a battle is on between two agencies for that control, said Poulson. He warned municipal utilities against the dictates of federal bureaucracy and to be on guard to preserve their automony. Further, he warned against too great subsidies on public power. If power developed at multipurpose dams is saddled with too heavy a load, then public power cannot compete with private utilities. If subsidy is overdone it would defeat the cause of public power, declared the congressman.

Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of Water & Power, gave a comprehensive review of California's water resources and the present status of water and power developments. He presented California's position in the controversy with Arizona over allocation of Colorado River water, pointing out the unreasonableness of Arizona's stand. Nothing short of Supreme Court interpretation of agreements and compacts can settle the argument. Morris urged that everything possible be done and as quickly as possible to get the matter before the high court.

Edwin Fleischmann, consulting engineer, San Francisco, discussed rising costs and their effect on rate structures. His paper is printed in full elsewhere in this issue. Frank Twohy, L. A. Department of Water & Power,

Secretary Frey, President Baxter

also dealt with economics and accounting. Said he, the utility industry differs from others fundamentally in that costs are important in both the proprietary and the operating aspects of the business. The use of an annual distribution rate in extending cost of labor instead of variable rates depending upon the number of days in a month gives a proper basis of comparison of cost of operation by functions. If this be done, then an hour's time for setting a meter in February, a 28-day month, will cost the same as if it were set in July, a 31-day month. Another point he made was that reporting of time can be simplified by preprinting work orders and account numbers on time reports opposite a word description of the work being done, thereby greatly increasing the accuracy of the accounts.

Power resources of California were discussed by Robert P. O'Brien, supervising engineer with the California Public Utilities Commission. He said that an estimate of state-wide loads and resources for 1949 reflects a fairly promising relationship on either a dry- or average-year basis. On the pessimistic side, there is the possibility of further delays in construction programs; daylight saving time will expire Jan. 16, 1949, which will increase peak by 365,000 kw. (on a pool peak of nearly 5,000 kw.); and rainfall may again be deficient. On the favorable side, are the completion within the next few weeks of 350,000 kw. of new steam capacity and subsequent completion of units throughout the year. Speaking on the controversial aspects of engineering economics, he quoted the recent statement made by Michael Strauss, commissioner, USBR: "There is no doubt about it, there are a lot of subsidies in public power projects." If recognized and properly evaluated this statement would serve to dispel much of the controversy injected into cost comparisons, declared O'Brien.

Paul Shaad, electrical engineer for the Sacramento Municipal Utility District, summed up problems of the distribution engineer when he said that flexibility to meet load growth over a very long period of years is much to be sought after by the distribution engineer. His plans must not call for tying up large investments in anticipation of loads which may not develop. At the same time his system must be ready to cope with loads perhaps totally unanticipated, and to do so economically and without causing permanent retirement of existing plant.

Floyd L. Goss, engineer, L. A. Department of Water & Power, reporting on revision of state safety orders, said that preliminary meetings on revisions are completed; that the Division of Industrial Safety is now rewriting orders for final hearings early next year. Preliminary meetings on general orders are now under way and the state labor association has submitted suggested working rules for station and underground groups with meetings to be held in north and south beginning early next year.

Experience working under the Collier-Burns Act, which provides a reimbursement plan in connection with

utility relocation on account of freeways, has been extremely satisfactory, reported Max Socha and Rex G. Goodcell. The Collier-Burns Act passed by the 1947 California legislature defined conditions under which utility facilities could encroach on freeways; provided a pattern for reimbursement of utilities for cost incurred in relocating facilities because of freeway construction; and finally, set up the procedure for cooperation between the state highway department and utilities for accomplishment of objectives of the act.

Other papers on water and sewage problems rounded out the three-day meeting. Officers re-elected for the ensuing year are: Glenn A. Baxter, Alameda, president; F. V. Frey, Pasadena, secretary. Announcement was made that the 1949 meeting of the association will be held in Santa Cruz.

Electric Clubs

Television is still 18 to 24 months away for Sacramento in spite of the fact that San Francisco will have a television station in operation around Dec. 15, Joseph H. Landells, engineer for Westinghouse Electric Corp., told members of the Sacramento Electric Club at its October meeting. Landells reported that all applications for transmitters have been frozen pending a decision by the FCC as to whether it will shift the wave bands for television.

IES

Highlights of the recent 1948 IES national technical conference were reviewed by T. H. Shepherd, vice-president, South Pacific Coast Region, IES, at the November meeting of the Southern California Section, IES. . . . Nov. 30 meeting, held jointly with AIEE, featured Al Rodgers with his *Light Sorcery* program.

Earlier in November the G-E *Light Sorcery* program was given before the Northern California Section of IES at a joint meeting with AIEE in San Francisco. . . . A course in practical illumination has been started by the Northern California Section; three separate classes are scheduled for San Francisco, Oakland, and Sacramento.

Illustrated explanation of troffer lighting, its use and applications, was given by Ed Heintze, sales engineer, Miller Lighting Co., at the November Utah Chapter meeting of IES in Salt Lake City.

RMEL

Rocky Mountain Electrical League held a meeting of the executive committee and division chairmen on Nov. 16 . . . Is busy planning its annual Christmas Lighting Contest. City will be divided into four sections, which will compete individually for prizes. Grand sweepstakes prize of $100 is being donated by the *Denver Post*.

AIEE

General Electric's demonstration *Light Sorcery* was put on by G-E specialists from Nela Park at the Seattle Section meeting of AIEE on Nov. 1.

NECA

E. R. Cornish, District 6 field representative, started classes in estimating procedure in the San Francisco Electrical Contractors Assn. and in the Peninsula Electrical Contractors Assn. in November. More classes will be held after the Christmas holidays. Both classes were so large that efforts will be made to obtain a school classroom for future meetings. Cornish said also that work is going on to expand the scope of both the Seattle and the Portland chapters to have them embrace branches in western Washington and throughout Oregon. Fresno Branch of the Northern California Chapter is likewise considering asking for a charter for a chapter of its own for the San Joaquin Valley.

Fresno Branch of the Northern California Chapter and Local 100, IBEW, completed negotiations for an addenda to their contract raising the wage scale to $2.50 an hour for journeymen beginning Dec. 1. The union had previously asked for vacations, hospitalization of employees and their families, and many other fringe demands. Settlement was made for the wage increase only when employers agreed to start paying the new scale a month early. The $2.50 scale has become general in California since the Oakland case.

Clyde L. Chamblin was elected the San Francisco Electrical Contractors Assn. member on the NECA board of governors. He, W. B. Baker, president, and W. J. Varley, manager, are the delegation to the NECA convention. At the Nov. 18 meeting a committee headed by Lloyd Flatland was asked to prepare a suggestion that NECA develop a national health, accident and disability insurance program for contractors themselves.

Seattle Electrical Contractors Assn. is advertising as a group in the *Daily Journal of Commerce*, offering guaranteed wiring, and listing the member firms.

Claude M. Hazlett, Pacific Coast manager of the motor division of Westinghouse Electric Corp. at Sunnyvale, addressed the Alameda County branch of Northern California Chapter, NECA, discussing the place that electrical development will have in the growth of the region. Henry Muller, manager, Westinghouse Electric Supply Co., arranged the program. Southern Alameda County group heard J. R. Lazarus, Pacific Coast Electrical Assn., speak on the uniform electrical code at its meeting Nov. 3 at Castro Valley.

Bureaus

A. H. Meyer of Leo J. Meyberg Co., San Francisco, will head the newly formed Radio and Television Section Advisory Committee set up by Northern California Electrical Bureau. The committee will collaborate with industry groups on promotional, technical and general information activities; is planning for a "T Day" campaign to launch television in the Bay area.

Date for the annual winter conference of the Bureau of Radio & Electrical Appliances of San Diego County has been set for Jan. 19, 1949, at the Hotel San Diego. . . . The popular basic sales training course sponsored by the bureau reopened on Nov. 1, with Dan Turner as instructor. . . . Bureau also has under way a six-session course for sales personnel.

IAEI

Two speakers and a number of inspector questions made the Nov. 6 meeting of the Northern California Chapter, International Association of Electrical Inspectors at Napa, Calif., a lively one. James Ambrosi of Oakland presided. Martin Landers, Napa electrical inspector, was host to the meeting. Speakers were Walter C. Smith, consultant for General Electric Co., who gave a talk filled with new things in science and electricity. Graham Holabird, district manager, National Electrical Products Co., spoke on multioutlet assembles, such as Plug-in Strip and similar assemblies. He asked for uniform interpretation by inspectors of code rules on the subject. Delbert Hansen, Oakland, chairman of the interpretation committee, gave the opinion that the length of the assembly was not important, if circuit breakers or type S fuses are used to protect the circuit. Harold Gerber, consulting engineer, offered to codify regulations of National Electrical Code, office of the State Fire Marshall, Department of Health and the Division of Industrial Safety as respects places of public assemblage. Next meeting will be held at Palo Alto, Jan. 15. At that time, the chemical engineer of the Division of Electrical Safety will speak on hazards from paint sprays and solvents.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

December 1948 ©

At least we didn't predict the outcome of the election in this News Letter.

Election reaction

Almost a month later it doesn't look quite as bad for business—hence jobs, incomes and living standards, for all depend on business health—as it did. Sober second thought reminds that politicians promise everything to get elected but seldom can buck reality. So price control, socialized housing, repeal of the Taft-Hartley and other "dog-house for business" promises may not get beyond the debating stage. The only thing it means is that business men—dealers like you—must waste time, effort and money to see that your congressmen know the facts of life; all of which time, effort and money could much more productively be put into selling better and more so that everyone could benefit. Business has begun to drag a little lately, not only in the West, where waterfront and oil strikes have reached deep into buying power pockets, but all over the country. It needs being worked at.

Get off that peak

To get through the winter nearly all utilities in Washington and Oregon have to ask all customers to refrain from using appliances and lighting as much as possible during the hours from 4:30 to 6:30 pm. The generators just can't take it, for that's when lights begin to go on, cooking is done, etc. They ask housewives to avoid oven meals unless prepared in advance; avoid using irons, washers, space heaters and turn off unnecessary lights. All dealers are being urged to assist in explaining the emergency. Not 'til 1951 is it expected there will be enough new generating capacity.

Thaw

When cold weather hit the East the flow of refrigerators West seems to have increased. There seemed to be only a few shortages in appliances to face the Christmas season, most of these of some particular brand only. With the steel situation still bad until next fall, there may be shortages again come spring.

Steel to roll

Thomas H. Ryan, Northwest district manager, Coolerator Co., told the 200 attending the Inland Empire Electrical Dealers Assn. Spokane meeting, Nov. 10, that the steel industry, finally awake to the idea that washers, dryers, freezers, and steel kitchen cabinets are here to stay, is rushing expansion of plant to roll more sheet steel, but it will take 9 months to a year. Then comes the deluge of appliances. (See full story next month).

And happy

Archie (W.A.) Marsden wasn't ready to quit the appliance game when he reached retirement. He'd been San Diego manager of General Electric Appliance Co., distributorship, for years. But Parmelee Dohrmann

Co., Los Angeles, needed a supervisor of its equipment department, which includes appliances, after opening its new store in Los Angeles in October, and Archie is it.

Out for Blood

Norge held its big distributors conference to brief them on the new 1949 line at Hotel Del Coronado, San Diego, Nov. 29-30. Howard Blood, president of Norge, and other top executives were there. Distributors from all the West attended. L. J. Meyberg Co. of Los Angeles handled all arrangements.

Seattle TV

Television is the big talk along the coast these days. Seattle's station, KRSC-TV went on the air late in November and the town staged a Television week beginning Thanksgiving day. Television distributors financed daytime programs that week for demonstration of sets by dealers. Dealers were talking of continuing the afternoon broadcasts after the distributors stopped. Regular schedule is from 5:15 to 10 pm. Wednesday through Sunday.

San Francisco

San Francisco's station KPIX wasn't on the air yet by Dec. 1; hoped to start by midmonth. But the industry was seething with preliminaries. The Northern California Electrical Bureau held a big dealer meeting at the Mart at which John Parsons, L. J. Meyberg Co., called on executives of KPIX, KGO-TV, KRON-TV to tell their plans and status to date. KGO ventured it might be videocasting by February; KRON said spring. All promised the best in programs through affiliations with Eastern networks and program sources. KGO has ABC tie-up; KRON the NBC link. Dealers, chairmaned by Cass Running, of Wiley Furniture pumped questions at the experts; some wondered when their inventory and installation crews would be able to move. Parsons concluded by advising to set sights on the big East-West game, New Years Day as positive. . . Distributors held showings too--RCA sent its sales general staff for a two-day show RCA-Victor dealers sponsored by L. J. Meyberg Co. J. B. Elliott, v-p of home instruments, H. G. Baker, gsm., J. A. Milling, commercial v-p of RCA service, Dan Halpin, TV sm., and Ray Saxon were featured. Al Meyer, J. M. Scales and John Parsons of Meyberg presented the local market outlook. . . Philo Farnsworth, who made the first electronic scanning for television work in a San Francisco workshop in 1926, was spoken of glowingly by his first backer, George Emerson, and his sister, at the Capehart-Farnsworth showing, sponsored by J. N. Ceazan Co. at the Mark Hopkins. Station KPIX, in the building, piped a special program to the dozen or more models on display after talks from Ralph Christie of Ceazan Co., Eustace Vynne, Pacific Coast regional manager of Capehart-Farnsworth and Jack Campbell of KPIX. Christie announced that all Capehart sets would be installed by dealers or by tested and selected installation depots at installed prices.

Set sales

Los Angeles television grows. In the first 9 months of 1948 there were sold 37,407 TV receivers in the metropolitan Los Angeles area, including both City and Edison territory, according to W. J. Quinn, manager, Southern Calif. Radio & Electrical Appliance Assn. This makes a total of 57,407 since March 1947 when video began. Sets are selling at the rate of 50,000 a year.

Pattern wanted

San Diego has to mark time for a station of its own. KFMB-TV had planned to be on the air by first of the year but the FCC froze all applications and permits until it can clear up channel interference. Meanwhile the Bureau of Radio & Electrical Appliances is seeking from its dealers a list of all TV sets sold and whether reception is satis-

factory in order to chart a map to indicate sections of the area can receive TV satisfactorily from Los Angeles stations. It estimates there are some 600 or 700 sets in use now. No promotion on TV is wanted by most dealers lest it knock the socks off already droopy radio sales. To show that TV knows no class market, a recent housing project fire listed a $400 TV set as a loss from one tenant.

Spokane even reports radio set sales slow, evidently awaiting TV, according to the Inland Empire Electrical Dealers Assn. news letter. . While Denver has no immediate prospects of standard television, an experimental station KFEL, will be built on Lookout Mountain at 7,300 ft. elevation to test ultra-high frequencies for possible 200 mile radius range. No other station is contemplated til 1950. — Inland TV

Giving a boost to flagging FM the Philco Corp. bought the entire time from 5 to 10 pm. on San Francisco station KRON-FM, Mondays through Fridays, on which to sell Philco products. — FM boost

There are upright types, portables, tank types and spitoon type vacuum cleaners, but now comes a Philadelphis salesman with a sink type, with a long rubber hose, says U. S. Rubber, to blow the dirt down the drain. — What next?

Crosley, says Nick Dinkle, Pacific Coast manager, will have two new TV sets "priced right," with 10-in. tubes. Factory will spring the 1949 line on all of its distributors in December. — Video sets

There's a new distributor for Admiral products in San Diego. It is William Goldy, a wholesale grocer who has set-up an appliance division or company to be known as Gold E Distributing Co. Location is 1905 East Harbor Dr. His sales manager is Bill Dunning, formerly of Ceazan Co. — Down south

Another super sales, stimulating, machine-gun sales conference is in the works at San Diego Bureau of Radio & Electrical Appliances for Jan. 19. J. Clark Chamberlain has commitments from Jack Otter, Philco radio executive and a half dozen others, Coast sales leaders and lots of local talent for a sales skit, financing panel, dealer panel and manufacturers and distributors impromptu rapid-fire talks to make it a highly concentrated day's bargain. — All in a day

For that most neglected but very profitable field of selling—home lighting, Moe-Bridges offers some specials in pin-up fluorescent wall brackets for bathroom, bedroom, make-up mirror, etc., and Unite-A-Lite fixtures with a choice of valences or fixed reflectors for numerous applications. — Pin-ups

Phil Gough has one more wheel under his distributor truck-trailer—He just returned from Europe with Los Angeles distributorship for foreign automobiles. Gough Industries will have an auto showroom at Wilton and Sunset. — Sailing along

Guarantees and licensing were the hot subjects at the convention of the National Assn. of Refrigeration Contractors at Chicago, Nov. 18-19. Neil S. Templin, secretary, Refrigeration Contractors Assn. of Los Angeles was one of the speakers. — Red hot

Philco buys range line

Philco Corp. has signed an agreement to take over Electromaster Inc., manufacturer of electric ranges, subject to the approval of Electromaster stockholders. Electromaster will be operated by its present management as a division of Philco Corp., and its output of electric ranges will be marketed for the time being under the Electromaster name.

Dinner speaker

Winter Market, Jan. 31-Feb. 5, at the Western Merchandise Mart, San Francisco, will be highlighted by the traditional Western Radio and Appliance Trade Dinner on Wednesday evening, Feb. 2. Principal speaker of the evening will be H. C. Bonfig, vice-president of Zenith Radio Corp., Chicago, who will discuss "Radio and Television Merchandising for the Future."

Trade-in promotion

Proctor will start its 1949 merchandising campaign with a trade-in offer of $2 on its $12.95 Champion iron and a $3 trade-in on its $18.95 Color-Guard toaster. Distributor shipments will begin in January with the products available to consumers on a trade-in basis Feb. 1. Free display material for each product will be provided by Proctor.

The heat is on

Industry-wide electric bedding campaign started in the Los Angeles area Nov. 15 and will continue through the Christmas season. Electric appliance manufacturers, distributors, The Los Angeles Department of Water & Power, Southern California Edison Co., City of Burbank, Glendale and Pasadena are backing their dealers with sales promotional material for the promotion. Reprints of ads appearing in local papers are being furnished to dealers for windows and displays.

Name change

From now on the National Electrical Retailers Assn. (NERA) will be known as the National Appliance and Radio Dealers Assn. (NARDA). Clif Simpson, managing director, explained the new name as more clearly descriptive of the business firms the association represents.

Mart news

Clyde O. Wallichs Co., East Bay distributors for Packard-Bell Co.'s radio, phonograph, home recorder and television products, has opened a new showroom at Space 420 in the Western Merchandise Mart, San Francisco. . . Television Distributors, exclusive representatives in northern California for Tele-King Television Corp., has moved into its new showroom, Space 958-A at the Mart. . . H. R. Basford Co., also at the Mart, is showing the latest Zenith AM-FM radio phonograph combinations with twin Cobra electronic pick-up arms for both long-playing and standard records.

Eased

Regulation W has been amended to permit a 10-day free home trial arrangement of a radio, vacuum cleaner or other appliance provided delivery is made "exclusively for bona-fide trial, approval or demonstration."

FM set

"Conquerer" is the latest table model FM receiver to be released by Emerson Radio and Phonograph Corp. Will retail at $29.95.

Two heaters

Frigidaire has added to its line two table top water heaters for use in kitchens, basements or utility rooms. The models have white baked enamel finish, table-top work surface, stand 36 inches high and 24 inches wide. Both water heaters have black marbelized acid-resistant tops.

Inside the house a field check test tells the installer whether TV can be received

WHEN TELEVISION COMES TO TOWN—

IS television coming to your town? If so, what will it mean to the electrical industry there—to the retailers, the distributors, the servicemen, the utility? The advent of television to any city already has proved to be an event filled with the *promise* of a prosperity unequalled since the coming of the all-electric radio opened that phase of the industry to mass sales. But it has been proved, too, that it is not the advent of a gravy train in which every member of the industry can scoop his share without preparing for and meeting a various number of problems that are inherent in the introduction of any radically new product.

Television, it has been said, will have more effect on the living habits of the American people than anything since the development of the motorcar. It may easily have more effect on mass education, mass entertainment and mass merchandising than any event since the development of movable type. As such, and with reliable members of the industry estimating that television will be a $5 billion industry, only the naive among dealers, distributors and other industry people would expect it to arrive and multiply without requiring that everyone associated with the industry spend the *time*, and in many cases, *money* needed to prepare himself and his organization to meet the problems, as well as to share the profits.

What the electrical industry in San Francisco, Seattle, Portland, Spokane, etc., where television is now starting or soon will get underway, will meet is best shown by analyzing what has happened nationally during the past three years of postwar television, and what problems have been faced in Los Angeles and Salt Lake City during the past 18 months since TV made its West Coast debut in those cities.

Sales Potential

Let's look at the bright side first. If there are going to be many problems for dealers, distributors, and utilities, will the whole thing be worthwhile? Nationally, there were 334,985 television receivers manufactured during the first seven months of 1948. In every section of the country where reception is possible, there is still a shortage of all but the very expensive consoles. At the present rate, there will have been more than 600,000 TV receivers off the production lines for the year 1948. With the increase in production of picture tubes, which has been the most important factor in holding up set production, the industry expects nearly 1,600,000 receivers to be made in 1949.

Because most of the receivers have been sold in the East and Midwest, where television has been on the air for some years, and where an inter-city network has provided an excellent choice of programs, many may wonder if receivers will sell in the West, where local stations will come on one at a time with limited program material. Well, Los Angeles is not complaining, and the pattern set there should fit every other major Western city.

During the first nine months following "T" day in that city, approximately 15,000 television receivers were sold, although only three major brands were on the market during most of the period and none of these were in full supply. During the first nine months of 1948, dealers in the Los Angeles area sold approximately 38,000 television receivers—just about $15,000,-

Status of TV in the West shown in this chart used by P. G. Caldwell, ABC, at the recent PCEA conference in Fresno. Circles indicate construction permits granted and in what number channel. Dark circle shows station on the air and its channel. Squares show number of applicants for remaining channels. Numbers give channels designated for each city or area

Map used by Los Angeles Department of Water & Power to explain television shadow areas to complaining customers. A light on Mt. Wilson on the contour map casts the same shadows that TV will over the area

000 added to the appliance and radio dealers' gross income. In addition, the industry took in approximately $2,300,000 in charges to the consumers for installation and one-year service guarantee.

Yes, says the skeptical dealer—but that is Los Angeles with all those Hollywood, Beverly Hills and Westwood homes of the movie people, and then there's the thousands of bars and grills there to provide a market. This dealer couldn't be more wrong. No more striking analysis of the market for television receivers has been published than the survey which showed that 80% of all television receivers have been sold to families with annual incomes of $6,000 or less, and that 40% of all receiver sales have been to families with $4,000 a year or less. And, while sales of television receivers to bars, restaurants, etc., during the first year in Los Angeles represented 9% of the total sales, that figure has decreased now until only 3% or less of all TV sets in the Los Angeles area are in these establishments.

Salt Lake City's television station, KDYL, went on the air with test patterns April 19, and with commercial programs July 2. Set sales to Nov. 1 totaled 812; 687 of these being in homes, the rest in taverns and dealer stores. Rate of sale is not spectacular. Sets are selling at a rate of about 67 a month but interest is accumulating as programs improve. The trade feels that the first six months are the hardest and that from now on the business will improve with the programs.

Station KSL has also applied for a license. It pioneered with a sensational local television demonstration during the spring conference of the Mormon church, televising the speakers and events inside the tabernacle to the overflow crowds in adjacent buildings. This alone showed thousands that television can bring more than just sports events to distant viewers.

Dealers in at least one of the new Western television markets have had an expert estimate the volume of retail

sales they could expect in the first year of telecasting. Frank M. Folsom, executive vice-president of RCA-Victor reported to the Western Market Week dinner that dealers in the San Francisco-Oakland Bay area should get about $10,000,000 gross from their sales of television receivers during 1949.

Even if the coming of television, therefore, may look like the arrival of a gravy train, one can be assured that no featherbedding is permitted. *Everyone will work for his ride.* TV did not come into the eastern or Los Angeles markets as a traffic appliance which the customer would pick off the counter, take home and plug in, and then forget. In every area, a lot of time, effort and money has been expended to produce each of these television sales dollars. Dealers, distributors and utilities have had varying degrees of headaches, many of them new and baffling, which had to be solved. And, to a lesser extent as the experiences in one city are passed on to others, the industry in each new television community will have to meet these problems.

The Distributor Meets Television

During the early period in a new television area, the distributors' organizations face the most work. They have ahead of them the problem of developing a market in which the prospects have only a second-hand, and often wrong, impression of what television is, what it costs, and what it will do for them in their homes. These distributors must select dealers for franchising—dealers who have (1) proved ability at merchandising, (2) a record of using ethical trade practices, (3) who have proved merchandising business, (4) who have the capital to floor a variety of models and the floor space to show them, (5) who will cooperate in advertising and promotion campaigns and (6) who will exert effort on their own to promote sales beyond the confines of their showrooms.

The distributors, too, must see that there is provision made for location checking, installation and servicing for every set their dealers sell. They must regard their dealers as neophytes in the television industry and start from scratch to teach them and their sales staffs how to display, demonstrate, and sell television receivers.

Most of this effort must start well in advance of "T" day, and beginning with the trip some of the distributor's staff must make to the factory for their training, it costs plenty of money well in advance of any return.

The distributors in Los Angeles met most of these problems, still have a few to solve. How some distributors went about franchising dealers is questionable—but the rumor that one wholesaler mailed franchises third class mail addressed to "boxholder," is not quite true. But it is true that several distributors had heard little, or paid no attention to the experiences of eastern distributors. Television sales franchises were given to many concerns with no previous merchandising

Field strength must be tested at each location to see if TV will work there. A portable antenna is set up outside

experience and no potential for specialty selling. Some went to appliance and radio dealers who had made reputations as "opportunists" and cut-rate specialists.

As a result, the television sales situation in Los Angeles was a paradox early in the period, and has changed little. While many established dealers, large and small, whose enterprising efforts to promote and sell TV sets put them far behind in delivery, customers could get 10 to 20% off list through purchasing from small shops, radio service shops, and even merchant plumbers who had picked up a post-war appliance franchise.

As late as November 1948, with most popular models of television receivers not yet in full supply at the regular radio and appliance stores, any model receiver was available through so-called "discount houses," "consumer buying clubs" and other questionable outlets at substantial discounts. In every case, these outlets had procured the receivers from franchised dealers who had neither the time, personnel or facilities to merchandise along normal lines.

While the distributors in Los Angeles may be excused because they were the pioneers introducing television without experience or without neighbors on whom they could draw for experience, it has become obvious that distributors in other Western cities need not make the mistake of franchising dealers without careful investigation. Otherwise, they will do as the Los Angeles distributors did. One of the largest radio and appliance dealers in southern California, who had spent thousands of dollars in cooperative advertising during the first nine months of television in that city, suddenly stopped all promotional effort, relegated his TV receivers to a corner of the floor. He became disgusted when he found that five important television set sales, each over $500, were ready for closing — then they didn't exist. Investigation showed that these near-customers, who had been brought to his store through his advertising expenditures, had picked up the same model at 10% off list only a few blocks away in a radio service shop.

Installation and Location

Many jobs facing the distributors in a new television area are those that in the long run will be the work of the franchised dealers. Foremost of these are *location checking, installation* and *service.* The inherent characteristics of the television signal—straight line transmission, ability to reflect, and limitation to 50-60 miles—make it imperative in most cities that each sale to an unchecked area be preceded by an engineering crew that can measure the strength of the signal that will be received on that particular make of receiver.

Over a period of time, the results of these location tests for field strength, having been recorded on a map of the area, will give a simple and reasonable pattern which can be used as a reference in place of further location checks.

Location checks for field strength in the Los Angeles area were a particular headache for Los Angeles distributors and for the dealers, through the sales they broke. And it is likely that they will bring to the industry in other cities, particularly San Francisco, a convincing demonstration of the limitations of present-dav television. However, dealers and distributors today will have the advantage of having transmitters with maximum permitted power—about 29,000 effective radiated watts in San Francisco—whereas TV

in Los Angeles started when the only two stations, KTLA and K2XOA, were transmitting on considerably less power.

As in Los Angeles, the early period, when it is necessary to make field strength tests for most sales, will be a costly item for the distributors and a sales headache for the dealers. As a rule, during this period, no sale of a television receiver is final until the location check shows that a satisfactory signal can be received.

When distributors' testing facilities are taxed, dealers may have to wait from several days to a few weeks to complete a sale. It is likely, and certainly advisable, that distributors assist their most competent dealers in setting up their own facilities for testing field strength. Both the television manufacturers and the radio instrument makers now have available nearly enough TV monitors and signal strength meters to supply the larger dealers.

Installation Charges

To have turned dealers loose with TV sets, allowing them to handle antenna installation, adjustment of the receiver, and then to carry out the manufacturer's guarantee, would have been suicide for the television distributors in Los Angeles and would have resulted in a severe setback for TV in that area. The distributors who didn't realize it when told by the manufacturers, and the dealers who didn't believe their distributors, soon found out that television isn't radio, it is radio-plus—plus more complications in circuits, previously unknown components, complex tuning, and much more resistance from nature.

The only solution in those early days in Los Angeles was for the distributors to arrange for the installation and service and to make a separate charge for it. Only a handful of dealers had the facilities for such work; even less could get the trained television servicemen to handle the work.

It is believed by the industry today that it takes a year of specialized television service training to make a competent serviceman. Not only that, the space and the variety of service and test equipment, plus an adequate stock of parts requires an investment of between $5,000 and $7,500, before a concern can give adequate television service. This was far too much for most dealers to handle, when it is considered that the investment must be made far in advance of the first profits from the sales of receivers.

The situation has changed in Los Angeles during the past 18 months, and it is still going to change more, but in the beginning the distributors took over the installation and service.

The Leo J. Meyberg Co., distributors for RCA-Victor, followed the national pattern by contracting with the local RCA organization for all the work. Above the cost of every receiver sold by an RCA dealer was the prescribed flat charge for installation and one year's service, varying from $45 to $95 for different home models. This charge was paid to Meyberg at the time the dealer accepted delivery of the receiver for his store's stock. In the beginning, Meyberg's made this charge after the dealers sold the sets, but they soon found that 50% of the dealers had tried to go ahead with the installation on their own, and trouble was resulting.

General Electric Supply Corp. began with a combination system. Those dealers who could prove to GESCO that they had the facilities and the trained men to handle the installation and service, were allowed to handle their own. However, G-E Supply retained one-third of the $55 to $85 charge for one year to insure that the dealer carried out the terms of the warranty satisfactorily. For dealers without facilities and personnel for installation and service, G-E retained three subcontractors controlled and paid by the distributor from the charge levied on the purchaser at the time of sale.

Gough Industries, distributors of Philco television in southern California, began with a combination system of a different nature. Gough permitted most dealers, those who had radio service men, to make antenna installations and to align the receivers. Then this distributor set up its own television service facilities to handle the maintenance of the guarantee. The dealer is reimbursed for the installation, with the rest of the $45 to $85 service charge going to Gough Industries.

Both G-E Supply and Gough Industries started immediately to prepare for the day when every television set sold by their dealers would be installed and serviced by those dealers. Both distributors set up service training schools. As time went by, much of the service and installation has gone over to the dealer organizations. But, in November 1948, it was still necessary for Gough Industries to maintain a large crew, and G-E Supply was still contracting with an outside organization for the installation and service of a large percentage of the G-E telesets sold by its dealers. Still confronting these distributors, as well as Meyberg with its RCA line, was the inability of all dealers to afford the outlay for service facilities and to procure the necessary television service specialists.

As other TV manufacturers followed RCA, G-E and Philco into the Los Angeles market area, the same pattern was followed, with a little more emphasis on getting installation and service into the dealers' hands. Long before Herbert H. Horn had a supply of Admiral telesets, he had sent most of his organization to the factory for sales and service training. He set up his own service facilities, even put an addition on his building, and got under way with a training program for Admiral dealers. Some, notably local manufacturer Hoffman, left it up to the dealer but provided exceptional training at the factory. Many looked to the independent service contractor as the most satisfactory method of guaranteeing satisfactory installation and service. "Iconoscope" is one of these concerns which holds contracts for some of the largest manufacturers.

Almost two years after television made its debut in Los Angeles, it is still likely that the above pattern will prevail in most of the other areas of the West, with slight changes due to the additional number of manufacturers ready to serve these new markets. Although any or all these methods will insure the solving of the installation and service problem for distributors and dealers, it should not be assumed that there will be an atmosphere of good fellowship all around.

That flat rate, running from about $45 to $95 for installation and service looks like a juicy plum to most dealers. They don't like to see it turned over to the distributors while they have a radio and appliance service department that may not be too profitable at the moment. And they are sure that the installation and service costs the distributor about 50% of that charge and that the rest is just a "distributor's cut."

These dealers don't realize that there are many installations in which the costs may run to $100 or more and that these have to be balanced against the simple installations that cost $15 to $20. The dealers may not have seen the recent figures from Los Angeles which show that, on an average for all makes of receivers, there have been *6 service calls per receiver per year.*

Dealers in Los Angeles complained that the practice of making them pay the distributors for the service and installation charge when they receive the teleset is an unwarranted burden on the dealer's capital. They feel that the money sunk into the service and installation charges for receivers held in stock prevents them from maintaining a full stock of television or other appliances. Possibly, in other cities, a compromise could be reached in which the dealer paid in advance the installation and service charges

Monarch ELECTRIC 2-OVEN ROASTER RANGE

THE ONLY OVEN BUILT FOR

Frequent basting...

Roaster is concealed when not in use—cover is flush with cooking top.

A complete oven dinner (roast, potatoes and vegetables) can be prepared in this built-in roaster.

...without stooping!

LIFT the cover and there's the food! No stooping! No hot oven racks to handle! *That's* what makes the SECOND oven in the Monarch Roaster Range America's most exclusive cooking convenience . . . . *America's most appealing electric range SALES feature.*

Write for a copy of this "reason-why" catalog demonstrating the Monarch Electric 2-Oven Roaster Range.

2 OVENS TIMER CONTROLLED

Monarch SINCE 1896

MONARCH MALLEABLE RANGE CO.

1920 Lake Street Beaver Dam, Wisconsin

for only telesets he warehoused, but did not have to pay in advance on those sets which he agreed to keep on the floor as demonstrators.

On the distributors side in the battle on installation and servicing, is the fact that many excellent merchandisers do not have, and are not the type of organization to set up, expensively equipped service departments and trained service personnel. In this classification would come the many large furniture and hardware stores, the department stores and many chains, which always have relied on outside service firms for all service work.

Then there are the dealers whose location doesn't permit a volume sufficient to warrant the service department required for the still complex television receiver. With these factors facing them, the distributors must continue to keep a finger on the service of the receivers they sell, seeing that a competent organization is hired by the dealer, or take over the work themselves.

In San Francisco, progress was made in solving the installation and service problem well in advance of the arrival of a television station. Those distributors who intended to permit capable dealers to handle installation and service set up schools to train dealers' service organizations. Western manufacturers Hoffman and Packard-Bell brought dealer men to Los Angeles for factory training. Many servicemen went out on their own, or on the dealer's sponsorship to study television servicing at trade schools and particularly at the one instituted under the San Francisco Adult Education program. At least one firm, this a very large electrical contractor, was considering the advisability of setting up an organization to handle installation under contract to dealers and distributors in the Bay area.

Chance to Demonstrate

Both distributors and dealers in Los Angeles met a serious problem when they considered the necessity of giving demonstrations of television receivers on the floor. Anyway you look at it, they found, a television receiver with no program to receive, is just a radio with an oversize glass eye. During the early stages, the television stations in Los Angeles were not on the air during the normal store shopping hours except with an occasional test pattern or with the camera focused on a news teletype machine.

To help solve this problem, the distributors of television receivers in Los Angeles got together and pooled $40,000 to sponsor a program at an hour when it would allow the dealers to make satisfactory floor demonstrations. Originally this program was under the control of the Southern California Radio & Electrical Appliance Assn., whose managing director Wm. J. Quinn and secretary Howard K. Burdick were instrumental in developing the program in behalf of the dealers. Shortly after it got underway, it was removed from the control of the association and put directly in charge of the distributors. Fifty-two daily programs were produced by the J. Walter Thompson agency and telecast over KTLA. The time of day for the shows was changed, moving from late morning to early afternoon as the result of tests on its use among dealers. The program was not renewed because by its expiration, several commercial shows were on the air for a daytime audience.

Whether such action should be sponsored by distributors in other cities in the West depends on the program of the local station. However, there is something for each city to learn from the experiences of the Los Angeles distributors. Such a cooperative effort cannot succeed without intensive promotion at dealer level. When the Los Angeles effort was taken away from the association—because the chain distributors were not allowed to support association activities—*it lost the promotional efforts of the association as well as the work of the dealer contact men of the local utility.* As a result, the dealers did not take full advantage of the program, many ignored it, a great many never kept track of the time it went on the air.

At the Dealer Level

In this discussion of the distributors' problems and responsibilities when television comes to town, many of the problems of the dealers have been aired. But there are some things that are truly the dealers' problems and that they *alone* must solve or be prepared for.

No dealer, in his rush to get on the TV bandwagon, should overlook the fact that it will require a sizable investment in stock. No full line on the market today can be handled without investing, or partly financing, at least $1,000 worth of receivers for floor display only, and he will have the additional outlay for signs, display pieces, literature, etc. These costs should not deter him, but should make him plan his inventory and purchases well enough in advance of television's arrival to allow the necessary capital.

He must know that the cost of installation for a customer is little to what he will pay for his own field strength test and antenna installation, under certain franchises. Some dealers in Los Angeles had to pay $15 to have their store location checked—and if it didn't receive the necessary microvolt reading, they were out $15 and a franchise. Cost of installing a dealers antenna has run as high as $165, when he was required to have it done by the distributor.

The dealer in a new television area has the job of learning to sell a completely new type of product. Basically, say the experts, the dealer must learn to sell *home entertainment* instead of the particular make or model of receiver. Just as he has been learning during the last few years to sell home freezing rather than home freezers, so must he direct his efforts in television—it is the idea of having programs in the home that will sell television originally. He is selling football games and other sports to the men, drama and audience participation shows to the women, cartoons to the children, all in their own home.

As a result of these requirements, dealers in Los Angeles have found it necessary to change their pattern of selling, because television is *family selling.* To sell the family, two things have been proved necessary—*home demonstrations* and *evening demonstrations in the store.*

Most of the Los Angeles radio and appliance stores that are doing outstanding jobs of selling television have had to keep their stores open—or at least the television department—several evenings each week. Dealers have found that it is necessary to get the family together not only to get the demonstration and selling message to the man, but also to get the man to sell his wife. In the early stages of television there has been noted a considerable sales resistance from the women. One reason is the preponderance of sport programs. Another is the difficulty in getting young children to go to bed just at the hour when the best programs are going on the air.

Home demonstrations have proved to be one of the most effective methods of selling television receivers, not only in Los Angeles but elsewhere in the country. Once a family has had a few evenings enjoyment from a TV receiver, without the presence of a salesman, few can resist the urge to keep the receiver in the home. Dealers who have shunned this free home trial because of the time and cost involved, usually have had to turn to it because in the long run it is a profitable sales builder. Assuming that there are no government restrictions preventing these methods, dealers have used various methods of working home trials and time payment plans.

Standard, and always usable, is the

The Farmer and the Contractor KNEW WHAT THEY WANTED!

THE FARMER WANTED a nonmetallic sheathed cable that would withstand weather extremes—stand up to fumes and corrosive vapors present in livestock houses and dairy barns.

THE CONTRACTOR WANTED a cable for jobs where extra quality is a "must" —a lightweight and flexible cable for easy pulling and clean, fast work.

The result? Super PVX*

Super PVX is a top-quality cable for those difficult jobs where easy installation and long service under the worst conditions are important. The tough, rotproof thermoplastic insulation and reinforcing glass braid result in smaller over-all dimensions and substantial reduction in weight.

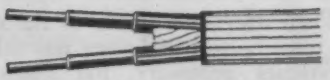
Super PVX
NONMETALLIC SHEATHED CABLE

The smooth, durable thermoplastic rotproof sheath is available in ivory or brown color, to give trim, neat appearance on surface wiring jobs. And, it's as tough as it is good looking, to provide ideal protection from abrasion, moisture, flame, corrosive vapors, and fumes. It is approved by Underwriters' Laboratories, Inc.

For samples, see your General Electric Construction Materials distributor, or write to Sec. W6-1225, General Electric Company, Bridgeport 2, Conn.

GENERAL ELECTRIC

AROUND THE CIRCUIT with your Merchandise Distributor



STILL DOING A GOOD JOB is PVX nonmetallic sheathed cable. This cable is light, small in diameter, and more flexible than conventional cables. These features are the result of skilled engineering in cable construction. They are built into PVX to give you easy handling, to speed installations, and to keep PVX on the job after it is installed. Let us give you more information on this outstanding cable. You'll find many uses for it.

DON'T WORRY ABOUT OIL—General Electric's Type TW wire doesn't. This thermo-plastic building wire has the ability to resist oil year after year, even when immersed in it. And, it's equally unconcerned about moisture and most chemical vapors or fumes.

EASY INSTALLATION—This service entrance cable can normally be installed exposed directly on the outside of the building. Service entrance cable is one of many items described in the new General Electric catalog, *Building Wires, Cable and Cords for every purpose.* If you would like a free copy, write to Section W6-1225.

DON'T OVERLOOK this sales potential—The next time you call on an industrial customer, look around and you'll notice dozens of uses for Flamenol* cords. Notice the variety of equipment that requires replacement cords. It's a good way to pick up extra business . . . and add to your volume and profit.

General Electric also makes rubber-jacketed cords in many sizes and constructions. They're built for long service and outstanding performance. Ask us about Flamenol or rubber-jacketed cords; we'll be glad to tell you more about them.

*TRADE-MARK REG. U.S. PAT. OFF.

few days trial followed by either full cash payment and the charge for permanent installation, or a down payment and the normal credit terms. Dealers in some sections of the country are using the coin meter, letting the purchaser pay as they see. In Los Angeles, prior to return of regulation W, some concerns were putting television receivers out on rental, with the usual provision that the rental fee would apply to the purchase price if a sale was consummated.

When television comes to the dealer's town he will find some new selling techniques necessary, but many of those used on radio still apply. The tendency of dealers since the war to provide separate rooms, decorated in home fashion, for the display and demonstration of radio-phonograph combinations, is a method that has proved profitable for television. In many cases, the smaller dealers make use of the same room, cutting down on the number of combinations displayed. Larger dealers can afford to provide separate rooms where the lighting can be adjusted properly for television viewing without injuring the display light needed for other sets. The separate room, when ideally located, can be entered in the evening without lighting and opening the rest of the appliance store.

All dealer advertising should carry plugs for television programs in order to stimulate interest and inform the public. Newspapers are slow to publicize a competitor.

Television is still an appliance, and basic principles have been found to hold—and no small one is the emphasis on personal service and personal contact with the customers. The middle-size dealer and the smaller ones, to an extent, must still continue to count on the personal approach as their biggest stock in trade. In Los Angeles, as elsewhere, in a free market, the smaller dealers who must rely on bank financing of their contracts cannot expect to compete with the chain stores and the department stores, and other large credit houses, on the basis of terms. But they can and do compete in television just as they have always competed with these stores in the sales of washers, refrigerators, etc.—through personal service.

The Associations and Television

If they try to profit from the experiences of others who have been handling television for a long time, dealers in new areas will be wise to take an active part in any activity relating to television which is sponsored by their local dealer association, local or regional electrical leagues. And they can help themselves for the future by being a sparkplug in these organizations to get them to assist in the local development of television. One thing all regions need is accurate figures from dealers as to number of sets in use so that this information can help obtain sponsors for good programs.

Currently, the newly formed television committee of the Pacific Coast Electrical Assn. is underway with a program to explore the sales problems and possibilities of television in its area, and to explore the more immediate problems of installation and servicing of television receivers, increasing the publicity for television programs, analyzing the proper background lighting for home television reception, and encouraging daytime programs that will assist dealers in demonstrating and installing receivers. Under the direction of Henry C. Rice of So. Calif. Ed., the committee has met twice and has its program underway so that it can assist not only the television industry in southern California, but also the areas soon to receive a television station. Because of the immediate success of the PCEA committee, and the interest expressed by the industry, it seems reasonable to expect associations elsewhere in the Western states to get started with similar programs, and to get organized as long as possible before the arrival of a television station.

Association activities on a local level have proved valuable. With the likelihood that city planning commissions will take an active and possibly punitive interest in the sudden appearance of a variety of TV antennas, it is worthwhile for local dealers and local electrical groups to organize standards for the industry before it is done for them, along with licensing, by outside bodies. The Bureau of Radio and Electrical Appliances of San Diego County through secretary J. Clark Chamberlain, got the jump on the antenna problem, petitioning the planning commission to accept the plan for standardized antenna installations as worked out by the bureau's electronics division. The group presented such a practical plan that the commission accepted it and no longer requires clearance by an inspector for each installation.

In Los Angeles, the Southern Calif. Radio & Appliance Dealers Assn., under Managing-director Bill Quinn, has organized a television group consisting of telecastors, manufacturers, distributors, dealers and the utility. Already this group is meeting regularly to iron out the problems that are arriving constantly as television sales increase in that area. Northern California Electrical Bureau likewise has a television and radio section.

TV at Macy's

Television shows attracted big crowds at Macy's department store in San Francisco last month when radio station KSFO and its television station KPIX transmitted programs of local entertainment to receiving sets within the store. Receiver sets were reached on all floors with the show staged on the store's fifth floor through coaxial cable. Programs were offered twice daily for a week.

Entertainment for the Macy telecasts was different for each show. Mrs. Cleo Filsinger, home economist, San Francisco division, Pacific Gas and Electric Co., presented a demonstration on one morning program.

Test patterns are scheduled to go on the air between Dec. 1-15, and by the middle of December the station anticipates doing programs. The first big San Francisco television event will be the East-West football game on New Year's Day.

Light Show in West

At the invitation of Westinghouse Electric Corp. and its distributors approximately 300 executives, engineers, utility and industrial groups interested in lighting problems, attended each of the West Coast presentations of the Westinghouse *Look to Light* stage show in October and November.

Two performances, matinee and evening, were staged at the Fairmont Hotel in San Francisco, and at the Ambassador Hotel in Los Angeles. The show toured Portland, Seattle, Salt Lake City and Denver for one showing in each city.

Produced by the lamp divisions of Westinghouse Electric Corp., the 90-minute show, played by a professional cast, related the story of lighting in the past, present and future. Six acts with effective stage sets were used to dramatize lighting methods in offices, stores, schools, factories, on streets, playgrounds and at airports.

Walter H. Thompson, San Francisco, Pacific Coast district, Westinghouse lamp division, was in charge of all shows, with the exception of Denver. In each city he was assisted by the local Westinghouse division manager.

Christmas Tree Lane Aglow

This year the bright lights of Fresno's annual Christmas Tree Lane will go on Dec. 15 and remain lighted through Dec. 26, with 58,000 globes strung over two miles of *Cedarus Deodara* trees.

FORWARD in '49

WESTERN WINTER MARKET

JAN. 31 thru FEB. 5

Forward with new products . . . new merchandising opportunities . . . and new selling techniques! You'll find them all at the Western Winter Market in San Francisco, January 31 thru February 5. Featuring the very latest showings of over 2200 manufacturers of all kinds of home goods, it will be a full week of activities planned to increase your sales and profits.

WESTERN MERCHANDISE MART

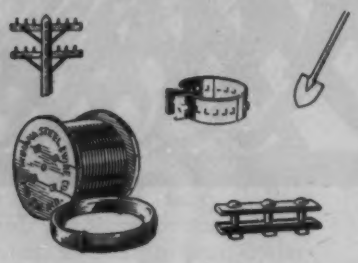
The wholesale market center of Western America for furniture, home equipment and related goods

SAN FRANCISCO

You say you don't buy 'em from Graybar?"

"Then maybe I can save you quite a bit of time and expense! Many utilities already are saving — by buying their pole-line needs from us. For distribution lines, high-voltage transmission, underground systems. Tools, too . . .

"First reason is, you can order everything for any line construction or maintenance job — just by picking up your phone and calling Graybar's local office! Buying everything from Graybar saves time and paper work . .



"And it's all quality stuff — carefully selected over the years by men who know the business. Graybar's items are the nation's favorites — products of leading manufacturers. Names you know and have confidence in . . .

"Whenever you need special technical assistance, one of the Graybar Specialists goes to work on your problem. Meanwhile, as your regular Graybar Representative, I can give you quick facts on any electrical items . .

"One nice thing about doing business with Graybar is — we're a friendly bunch. Our local people take a real interest in their neighbors and customers. Yet you get the benefits of our nation-wide set-up and experience . . .

"Graybar is fussy about the people it hires. That goes for the folks behind the scenes too — like our order editors. Our clerks are accurate. Our warehousemen know how to pack your stuff and get it delivered on time! . .

"The fact that Graybar is the oldest and biggest distributor of pole-line supplies may not set you on fire. But our long-time, close relations with leading suppliers don't hurt a bit — specially when you need emergency help . . .

"One thing about Graybar that really makes us different . . . we're 100% owned by ourselves — operating and retired personnel. That makes us anxious to please. Gives you the kind of attention you want, on every order! . .

POLES • CROSSARMS
STRAND • INSULATORS
HARDWARE
PROTECTIVE DEVICES
LINE TRUCKS
CONNECTORS • TOOLS

*Graybar QUALITY Since 1869
* REG. U.S. PAT. OFF.

Everything Electrical
*Graybar
ELECTRIC COMPANY

IN OVER 100 PRINCIPAL CITIES

"When you need pole-line items, remember all these reasons for ordering 'em from Graybar".

Executive Offices: Graybar Building, New York

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © DECEMBER 1948

Develop The Disposer

When it's disposers you're selling remember there's plenty to talk about. This is one appliance that should create high consumer interest FAST.

To many prospects you'll be introducing an appliance they know very little about. It will be a matter of giving a brief but complete story on the disposer. Right off let the customer know the disposer **replaces** the garbage can. This one fact carries with it these strong HEALTH appeals:

1. Eliminates the **unpleasant task** of **wrapping up wet garbage** and taking it to a refuse can outdoors.

2. Eliminates **cleaning the garbage can** after the collector has come around.

3. Eliminates the **odor** and **insect** problem so prevalent when garbage cans are in the kitchen or yard.

4. Eliminates the possibility of garbage outdoors tipping over and becoming **a breeding place for bacteria.**

Explain in simple terms the working of the garbage disposer (or better still demonstrate it). The disposer reduces food wastes, such as meat trimmings, parings and rinds, into a fine pulp that is washed down the drain like water. This means the housewife can scrape her dirty dishes and other wastes into this ingenious machine without any further handling. It is an important advantage to be able to dispose of food **as** it becomes waste, not after it has accumulated over a period of time.

Emphasize to the customer these positive appeals of an electric disposer:

ECONOMICAL. A disposer operates at low cost.

SANITARY. Keeps the sink tidy and clean at all times.

CONVENIENT. The simple task of disposing of gabage is done right at the kitchen sink while the housewife is preparing her food.

OPERATES EASILY. Turn on the cold water, flip the switch, and scrape the waste down the drain. That's all.

TIME-SAVING. No extra steps or effort involved in wrapping up garbage or taking it to a container.

The garbage disposer is unquestionably one of the most practical and useful of the kitchen appliances. For any home it's a step forward in hygiene and convenience. It's up to you to prove it to the customer.

To be financially successful set up a

Fair Compensation Policy

advises

Ken Hampton

IT was Shakespeare who said "the prosperity of a jest lies not with the teller but in the ears of the hearers."

Peculiarly, the compensation of salesmen lies not entirely in the greatness of the **amount** but in the demonstrable **fairness** of the plan of pay. Our purpose here is not to set up specific suggestions for amounts to be paid but to set forth the principles involved in good sales compensation plans.

All employees want to be fairly and adequately paid for work performed. If they do service over and beyond the call of duty they want that extra effort to be **appreciated.** Employers want adequate control over their salesmen to enable them to direct sales effort toward selling any or all of the stores' products the way and at the time the owners want them sold. The point of control on these two desires is the sales pay plan. Fully as important as the details of the sales plan is the manner in which it is administered.

In paying retail store salesmen, time and experience have proved the following practices to be good:

1. **A base salary** should be paid all salesmen that will be sufficient to meet their basic living needs. Salary increases for desirable work habits and performance in building good will can be worked out for men of proved ability and performance. The payment of a salary gives the employer a basis for directing the salesmen's activities.

2. **A bonus or commission** should be paid that will encourage the salesmen to work hard to make sales. The commission plan should be easily understood by the salesmen and easily administered by the manager and accounted for by the bookkeeper.

3. **The plan should provide** that salesmen's time be divided between time in the store and time out contacting customers. Salespeople's hours of work must necessarily be irregular due to the customers' demand for appointments at their convenience, but provision for this should be made so the salesman will know he is working on time he is compensated for and directed to use rather than believe he is donating his time.

4. **Transportation expense** on company business should be paid. This point is often overlooked and can cause much ill will. Often a very small flat monthly sum for automobile or other transportation expense will pay huge dividends in salesman morale.

5. **Living expenses** such as meals bought for customers may be paid by salesman from his pay or reported separately and paid by the firm. However, whichever is to be done should be thoroughly understood by the salespeople.

6. **Sales contests** are necessary. They need not be elaborate, but should be easily understood and readily administered and generally of relatively short duration.

The change in time and the development of new products have brought about a situation that indicates the need for broadening our pay plans to compensate employees for doing a balanced job of selling all of the appliances being offered by the store. There is ample reason to believe that in both inside and outside selling activities, salespeople should be alert to create interest, not only in the appliances featured but in any other product that the customer needs.

Above all, both manager and salespeople must have complete faith in the fairness of the pay plan and the honesty with which it is administered.

In the Electrical West Sales Guide for September, 1947, R. L. Wilkinson presented an article titled "How Shall I Pay My Salesmen?" that details a good, sound analysis of various methods of paying salesmen. It is worth reading and using as a guide to check present plans dealers are using.

for better fluorescent lighting

DEMAND *Certified Ballasts*

• When you demand and insist on Certified Ballasts in fluorescent lighting fixtures—you're protecting your own best interests—as well as the users'.

Everyone benefits by using Certified Ballasts because they assure . . .

Full lamp life **Rated light output**
Quiet operation **Dependable performance for fixture life**

Strict specifications control the building of every Certified Ballast—Electrical Testing Laboratories, Inc., an impartial judge, then checks and tests them. You're surer of satisfaction with Certified Ballasts.

CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

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NERA MEET EVOLVES POLICY

FIVE clear cut suggestions designed to improve relationships between appliance retailers, distributors and manufacturers were developed in Los Angeles, Oct. 25 and 26 at the first annual West Coast Leadership Conference of the National Electrical Retailers Assn. Attending the meeting were appliance retailers from NERA chapters in greater Los Angeles and others who came from San Joaquin Valley cities. Phil Urner of Urner's, Bakersfiield, and a director of national NERA, was in charge of the meeting which brought NERA's managing director Clif Simpson from Chicago for the occasion. (See page 118 for suggestions presented.)

The suggestions, which include franchise improvements, service responsibility, damaged goods, malpractices among dealers, and sales promotion, were the outcome of two morning and two afternoon discussion panels in which all dealers present had an opportunity to express their views on these subjects. Simpson will take these suggestions to the National NERA convention in Chicago in January, for possible incorporation in a national association policy.

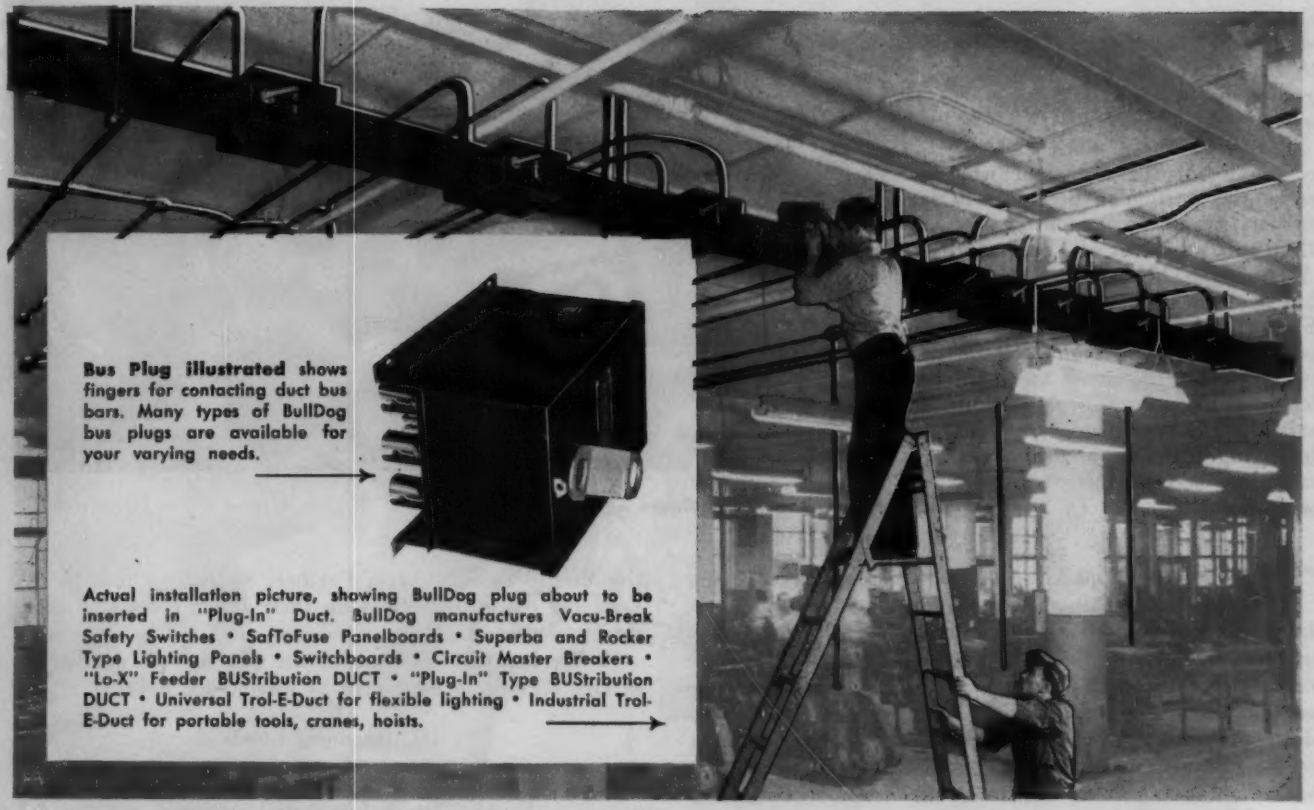
The opening session brought the dealers face to face with the need for improving the franchise which, one dealer said, is "a one-way street outlined by the lawyers of manufacturers and distributors." Simpson reported that six national manufacturers have put NERA model franchises into the hands of their lawyers for study, and that there is evidence that several manufacturers already are cutting down on the number of dealers. He said that NERA is in the process of setting up teams of two dealers in various sections of the country which will meet with Simpson and individual manufacturers to discuss franchise arrangements.

Improving the supplier's various services to his dealers came in for discussion at the second session and the results went into the group's recommendations on "service responibility." It was brought out in the floor discussion that the dealers are carrying too much of a load on the free service that is guaranteed by the manufacturers. Dealers complained that they were having three to four times as much service to provide free on the appliances that have been produced since the war—mostly because of "bugs" and because of the introduction of so many automatic appliances.

Not only the return of age-old practices of trade diversion, discount and backdoor selling were problems handled in another session of the NERA meeting, but also some postwar versions that are creeping in, particularly in the Los Angeles area. The development of "discount clubs" operated from desk space in real estate offices, which offer discounts from 10 to 30% on all types of appliances, came up for discussion. It was emphasized that in most cases, some retailer was at fault, because these discount houses were able to pick up any appliance at dealer level. Following a talk by Robert Sample of the Better Business Bureau of Los Angeles, the group pledged its support to better business bureau activity and recommended that NERA do this on a national scale.

Cutting the dealer in on multiple sales of appliances to builders, etc., took a major part of the discussion at the opening session of the second day, but did not result in a recommendation to national NERA. Simpson told the dealers that the most serious problem is the builder who buys 100 appliances, uses only a few on the job, and then unloads the balance at discount to friends, employees, and the gray market. Dealers suggested that in most cases it was possible for the retailer to handle multiple sales if the provisions for them were covered in the franchise agreements, and if the discount was not more than 10%. One dealer felt that the biggest loss in multiple sales was not the commission on the sales but the loss of that initial contact with the customer which could be developed into more sales later.

Television will be the greatest impact on the living habits of the American public since the advent of the automobile, said H. Leslie Hoffman, president of Hoffman Radio, Los Angeles, in his talk to the NERA group at luncheon on the opening day. In giving the dealers a picture of television market, Hoffman surprised many of them with the statement that TV is not a class market as so many people think. He pointed out that 80% of the TV sets sold so far in the country have gone into homes with a $6,000 or under income, and that 60% of the sales were to families who had $4,000 or less income. He said that the suburban and semirural areas



Bus Plug illustrated shows fingers for contacting duct bus bars. Many types of BullDog bus plugs are available for your varying needs.

Actual installation picture, showing BullDog plug about to be inserted in "Plug-In" Duct. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution DUCT • "Plug-In" Type BUStribution DUCT • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

Power you can tap without tapping the till

DOES your production line go to sleep every time you install a new machine or move an old one? Do you have to cut the power? Cut production? And take a cut on profits?

With BullDog "Plug-In" BUStribution DUCT, you can tap *live power* where you want it, when you want it. To move a machine, or any number of machines, you simply disconnect the plug from the duct, move, and reconnect at the new location.

All other machinery keeps humming a tune of dollars saved when "Plug-In" power plugs the profit leaks of complete shut-down.

Efficiency means economy

BullDog "Plug-In" Duct offers low initial expenditure . . . practically no maintenance requirements . . . maximum safety and flexibility. Material is selected for long life and properly designed for relocation adaptability. "Plug-In" Duct is an investment that will pay dividends in years of usefulness, efficiency, economy.

Completely salvable

Like all BullDog BUStribution systems, "Plug-In" Duct is *completely salvable*. When you move the system itself, not a single part need be scrapped . . . not a nut or bolt. Call your BullDog Field Engineer. He has full technical data on all BullDog products and will be glad to answer any of your questions. If you wish, he can show you a BullDog installation near your own plant.

BullDog's Field Engineers welcome the chance to sit in on planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation and maintenance costs, as well as highest efficiency and reliability in actual operation. Why not take advantage of this pre-building service?

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

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Coast Electric & Manufacturing Co.
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Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

would be the best market because those families have more difficulty in getting into the city for live entertainment.

There is still a place in the retail economy for the merchant who can serve the particular needs of a particular group of people, said Wm. Cranston, president of Thermador, Los Angeles, in his talk to the NERA luncheon on the meeting's second day. Following his statement that the independent dealer or manufacturer cannot outsell or undersell the large outlets and the chain organizations, he said that the independent's future lies in giving better service and personal attention, because there are customers who want that.

Weinheimer Simpson Urner Cranston

THIS report is made at this first annual West Coast NERA Leadership meeting jointly to various manufacturer's representatives and distributors who are meeting here with West Coast NERA leaders. We are cognizant of the fact that manufacturers and distributors are anxious to do everything within their power to enable the dealer to do a more efficient job in the sale and servicing of the products distributed and sold in our industry, and so we offer the following for your consideration, and strongly recommend that individually you plan to adopt the following suggestions.

I. Franchise Improvement

1. We, the dealers, would like to recommend that the franchise be made more valuable by reducing the over-franchising condition which exists in certain market areas at this time and by improving the quality of the franchise by definite requirements which will insure that the merchandise is properly handled and properly serviced to the full satisfaction of the customer.

2. We believe that the appliance and radio industry will be better served by channeling all sales through franchised dealers who maintain adequate stock and display and who possess state resale licenses. We believe the practice of wholesalers selling over-the-counter or via the "back door" should be stopped.

3. We endorse the principles of the California Fair Trade laws and recommend that more distributors and manufacturers place their products under the provisions of the act.

4. We strongly urge that manufacturers and distributors maintain an adequate stock of parts, easily accessible to the dealer without long waiting periods to receive vital parts. It is especially important on current models.

II. Service Responsibility

1. We believe that the industry should definitely state the obligations of the manufacturer, the obligations of the distributors, and the obligations of the dealer in fulfillment of the warranty service in easily understandable language that consumers can fully comprehend.

2. We recommend that the dealer be reimbursed from the date merchandise is received or from the date of sale for labor costs incurred in replacement of units on refrigerators, automatic washing machines, and freezers. We also believe dealers should give a labor allowance for modifications of any defective merchandise made defective due to factory error. Further, we believe that the allowances made to dealers on their labor costs should be reviewed periodically.

3. We heartily recommend the practice of conducting service schools in each area at least twice a year.

III. Damaged Goods

1. Each dealer, upon examining merchandise showing damage, should contact his distributor and get the following information: freight bill, date and number and freight car number and initial. He should then contact his last carrier, asking for a *preliminary* inspection report in duplicate. Then he should be able to return this merchandise to the distributor for replacement in case the parts for the complete repair of this merchandise are not available within 30 days.

IV. Malpractices Among Dealers

1. We believe distributors should cooperate with the dealers and the Better Business Bureau in lessening the evils practiced by many dealers, such as misleading advertising and gross misrepresentation.

V. Sales Promotion

NERA keenly appreciates the great importance to the dealers of larger sales volume in the years ahead. We believe, however, that all industry sales programs should pivot around the dealer, and we therefore:

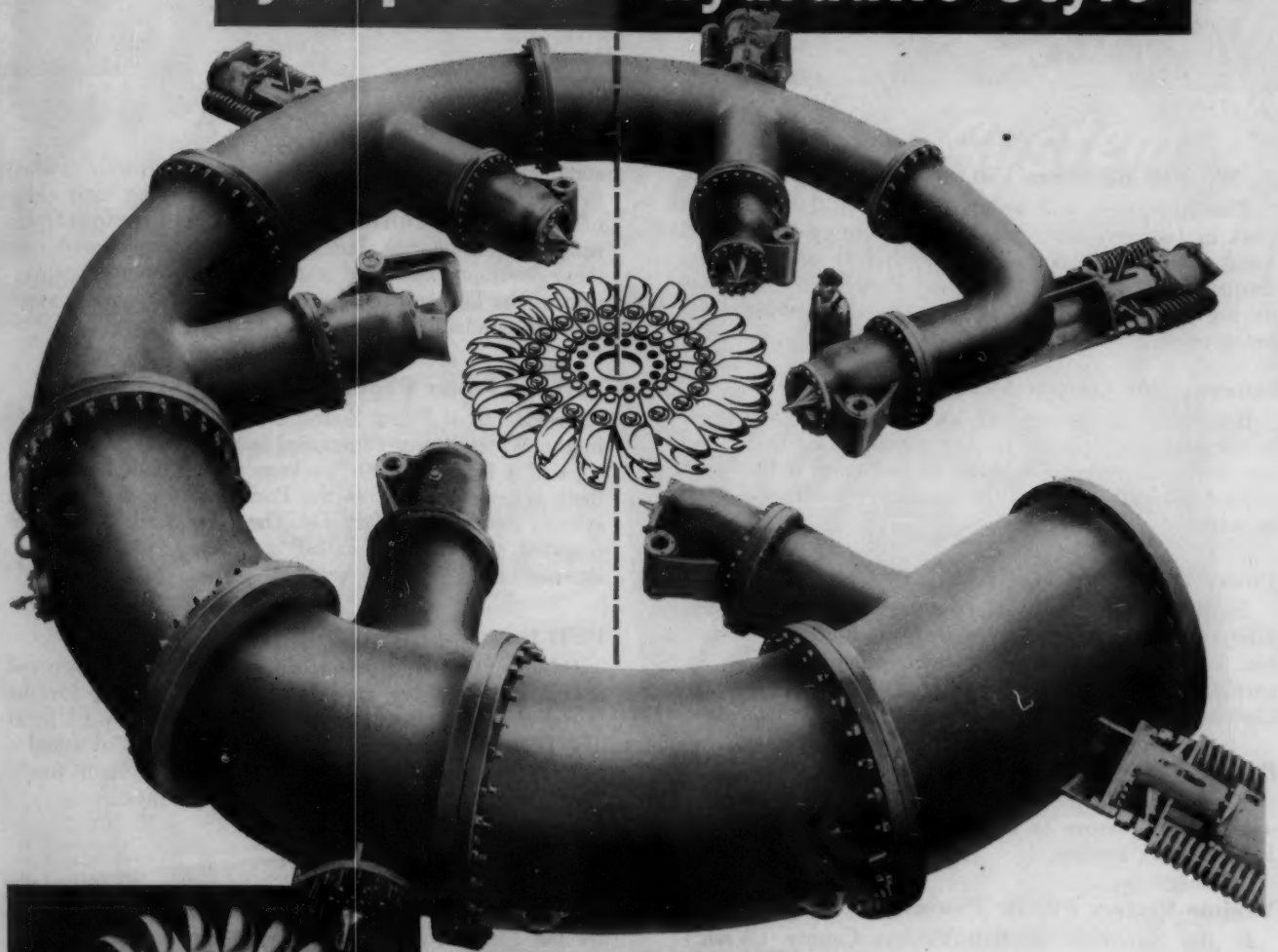
1. Urge the appointment of industry-wide committees of dealers, distributors, manufacturers and utility companies to formulate special cooperative campaigns to secure needed plus business from the increased sale of products which have not yet been fully accepted, such as freezers, ironers, dishwashers, disposals, blankets, frequency modulation and television.

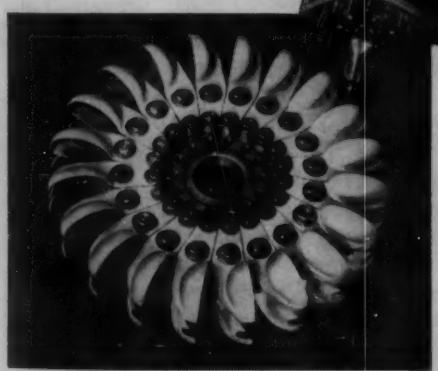
NERA further recognizes the cold fact that regardless of how well our industry sales promotion efforts are planned, dealers cannot effectively get behind any program *unless they have competent salesmen.*

In view of the facts divulged by the nation-wide survey made by NERA in November 1947, which emphasized the serious lack of sales applicants and the inability of the average dealer properly to select and adequately train those he does employ, we therefore:

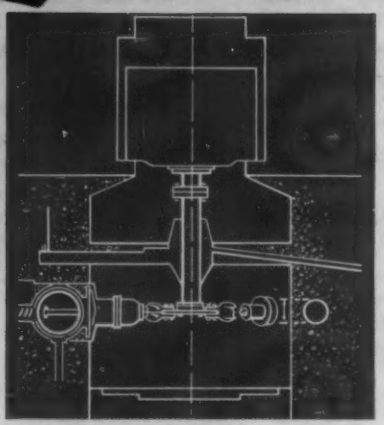
1. Urge the entire industry to accept and support the NERA recruiting program, designed to help dealers locate, select, train and properly compensate salesmen.

jet power hydraulic style





Buckets for the Pelton runner can be fabricated from plate steel or cast using mild, stainless or other special alloy steels.



Vertical impulse turbines reduce powerhouse construction costs as the vertical turbine-generator arrangement conserves powerhouse floor space, and the impulse turbine does not need the elaborate draft tube construction required by a reaction turbine. Since parts are less subject to wear, the impulse turbine keeps its high efficiency with little maintenance for long periods of time.

NO TOP MILITARY SECRET...

but an outstanding engineering achievement is the ***vertical six nozzle*** *impulse turbine illustrated. Its six perfectly balanced jets will produce 62,000 HP under a head of 1,118 feet, and will drive a 50,000 KVA generator at 300 RPM.*

• Wholly designed by The Pelton Water Wheel Co., the first of three such units for the Bridge River Powerhouse of the British Columbia Electric Railway Co. Ltd., is now in operation. The many important features of these turbines represent another Pelton contribution to hydro-electric development and progress. For high head installations, and where large unit capacity is required, the efficiency of the vertical impulse turbine is comparable to or exceeds that of the reaction turbine.

BLW THE BALDWIN GROUP

The PELTON WATER WHEEL Company

A Subsidiary of the Baldwin Locomotive Works

2929 NINETEENTH STREET • SAN FRANCISCO 10, CALIFORNIA

THE MONTH IN BRIEF

N. W. Will Be Short 150,000 Kw.

The Northwest will be short about 150,000 kw. on peak in January, according to word coming from there. Load molding, dropping voltage slightly and allowing frequency to sag over peaks and then correcting time during light load periods of the same day are measures being considered to meet the situation.

Interruptible Contracts Cut Back

Bonneville last month cut back 82,000 kw. of power to the aluminum plants—power which it had been serving on an interruptible basis. It had carried this load beyond expiration date of the temporary contract as long as water held out.

Power from Canada

Northwestern states were receiving up to half a million kilowatt-hours of electricity nightly from British Columbia. Export of power to the U. S. is made possible by surpluses created between 7 p.m. and 7 a.m. at B. C. Electric's new Bridge River plant.

Ranier Rejects PUD

Voters of Ranier, Ore., rejected by nearly a three-to-one margin a move to establish a PUD. The vote was 114 for; 327 against.

Yakima Prefers Private Power

In the November election Yakima County (Wash.) indicated a preference for private operation of its electric service. In a contest between two sets of candidates for PUD commissionerships, the issue was public vs. private power. The private power proponents won over the adherents of a proposed Yakima PUD.

Salem Co-op Wins Franchise

At Salem voters approved a measure requiring the city council to grant a franchise to Salem Electric, a cooperative serving a small area in the business district under a temporary permit. In two previous elections, the voters had rejected the co-op's petition. The issue was placed on the 1948 ballot by initiative petition.

Colorado River Controversy

The only way to settle the controversy between California and Arizona over allocation of Colorado River water is to get the matter before the Supreme Court, says Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of Water & Power. Time is the essence, says he, and every effort should be made to place the matter before the high court at the earliest possible day.

Oregon Defeats Amendment

A measure amending the hydroelectric commission law by liberalizing its licensing and acquisition provisions was rejected in Oregon at the Nov. 2 election. The bill would have repealed the part of the law which permits state or municipalities to take over privately owned hydro plants upon two years notice by paying "fair value of the property but not exceeding the net investment plus reasonable severance damages." The bill proposed that these developments could not be taken over until expiration of the license period, usually 40 to 50 years, except through condemnation.

Package Power Plan Reported

Presidents of Puget Sound Power & Light and Washington Water Power companies last month denied knowledge of a $200,000,000 "package price" plan for sale of their systems, as well as the Pacific Power & Light Co. system, to a group of PUDs. The New York *Times* had reported such a plan, called it "very probable of consummation."

PUD Unit Approved

Oregon State Hydroelectric Commission has approved a contract involving an expenditure of $80,000 for the initial electric unit of the North Wasco County PUD, at The Dalles, Ore. Pacific Power & Light Co. had asked a hearing on grounds that the competitive system would result in a hazard, but was denied its request.

No Change in Public Power

The picture on public power will not change materially in the opinion of Norris Poulson, California congressman for the 13th district. This is because many conservative men will remain in office, he told the California Municipal Utilities Assn. recently in Santa Barbara.

Private Initiative Not Dead

Private initiative is not dead and we do not need a subsidy to develop some of our water resources in the future, said Frank E. Bonner, consulting engineer and former member of the FPC, in speaking recently before the public utilities section of the Commonwealth Club in San Francisco.

Seattle Contractors Charged Again

Seattle Electrical Contractors Assn., four Seattle electrical firms and 12 individuals have been charged in U. S. District Court in Seattle with conspiring to restrain trade in violation of the anti-trust act. The information is similar to a federal grand jury indictment returned at Seattle early this year and later dismissed on a technicality. It charges the defendants with "arbitrarily setting" electrical installation prices in the Seattle area since 1936. All pleaded not guilty to the indictment before it was dismissed.

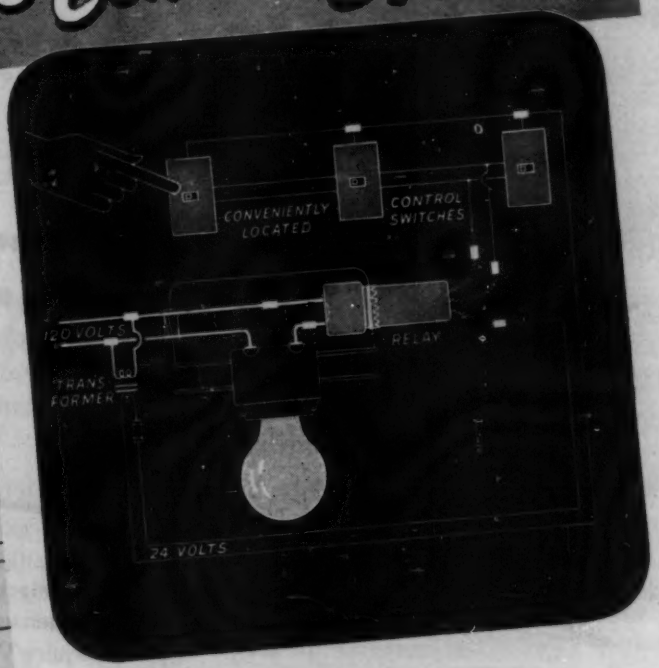
Straus Admits Subsidy

Michael Straus, commissioner of the U. S. Bureau of Reclamation, at a recent press conference in San Francisco made what some consider an amazing statement when he said, "There is no doubt about it, there are a lot of subsidies in public power projects."

Light the path ahead

WITH SQUARE D's NEW Low Voltage Control System

use this
Remote Control Relay System
instead of conventional switching
for greater
CONVENIENCE • SAFETY • COMFORT
. . . at very reasonable cost



• The above sketch shows how remote control relays are installed in knockouts of outlet boxes. The relays are controlled from any number of conveniently located switches operating on a 24 volt system. Only the load circuit wiring is at 120 volts.

One relay can be operated by several control switches, or several relays can be operated from one or more locations, using master switches.

Write **for Bulletin No. 1008, which gives details of this simple, low-cost way to adequate switching.**
Square D Company, 4335 Valley Blvd., Los Angeles 32, California

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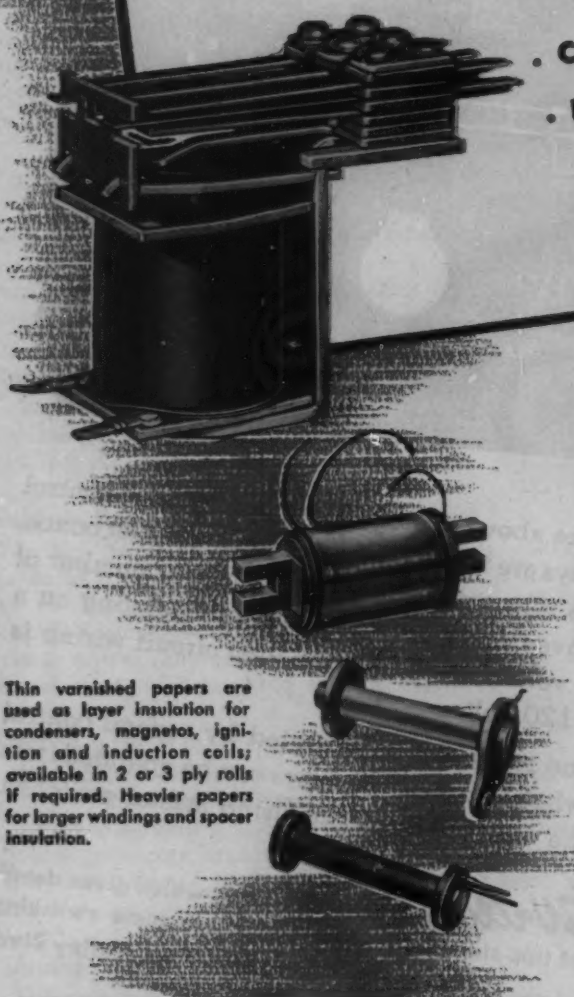
for electrical components...

the complete line of varnished papers

• Condenser Tissue • Varnished Kraft
• Bond • Red Rope • Saturated Kraft
• Asbestos



Thin varnished papers are used as layer insulation for condensers, magnetos, ignition and induction coils; available in 2 or 3 ply rolls if required. Heavier papers for larger windings and spacer insulation.

For electrical components — from the smallest coils and condensers to magnetos and large relays — wherever you require Varnished Paper insulation — use flexible Irvington Varnished Papers. Choose from a variety of types and thicknesses adaptable to every varnished paper need.

By specifying Irvington Varnished Papers you benefit from 40 years of experience in developing and manufacturing varnished insulations. Base papers must meet rigid specifications before acceptance for varnishing—low acidity — uniform thickness — tensile strength — resistance to tearing. Papers are coated with Irvington Insulating Varnishes for high dielectric strength, resistance to heat, oil and moisture. Special care in coating assures a varnish film that is smooth, even and free from pinholes.

Write today for test samples of Irvington Varnished Papers. Specify types and thicknesses from the list below at left. Papers are available in full 36 inch width or tape rolls, or in sheets.

TYPE	THICKNESS RANGE
Condenser Tissue	.00075" to .002"
Kraft Papers	.00125" to .020"
Bond Papers	.0015" to .006"
Red Rope Paper	.007" to .015"
Asbestos Papers	.007" to .030"

IRVINGTON

Varnish & Insulator Company

Irvington 11, New Jersey

Represented in the Western States by C. D. La Moree, Los Angeles, San Francisco, Seattle; Electric Motor Supply Co., Denver

"Give us the tools . . ."

For High Wages, Full Employment . . . Business Must Have Better Tools *and More Money to Pay for Them*

So far we have escaped the post-war depression predicted by leading government economists. How can we continue to frustrate gloomy prophets who see only depression ahead?

At the end of World War II the federal Director of Reconversion saw depression immediately ahead. He said we would have 6,000,000 unemployed four months after VJ-Day and 8,000,000 a few months later.

But we did not have depression. We did not because:

First, the American business man, sensing the obligations of a vastly more important post-war America, went ahead to build his plant and equipment to meet expanding domestic and world markets—markets bigger actually and potentially, in terms of world-wide trade and profits than any previously envisaged.

Second, the American businessman was able to get the money to go ahead. Since 1945 he has spent $50 billion building new plants and buying new equipment.

There may be other reasons why we missed a depression in 1946. But—make no mistake about it—what has powered our present prosperity is the $50 billion spent by businessmen since VJ-Day to improve their plants.

It provided jobs directly for 5 million people. It paid for more than half of our record-breaking steel output. It put in place the foundations of great new industries such as television. It strengthened the foundations of the chemical, machinery, plastics, steel and oil industries. It has expanded and improved our power systems throughout the country.

This spending has made the difference between prosperity and slump, between industrial strength and serious deterioration.

In fact, we know now that what business spends for new plants and new tools always makes the difference between prosperity and slump, the difference between national strength and weakness.

The accompanying chart tells the story. When we have spent heavily for new plants and equipment, we have had prosperity and strength. When we have not, we have been in trouble.

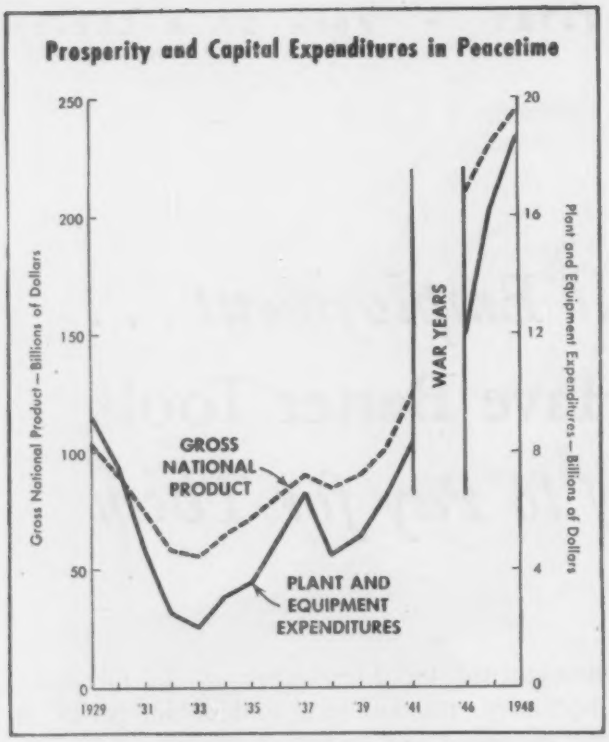
We would have been in trouble since VJ-Day except that business used its war reserves, plus two-thirds of its profits, plus borrowed money to improve and expand its facilities. This year industry is spending $19 billion this way.

Has this great post-war expansion actually made our economy a "mature economy"? Have we come now to the saturation point the New Dealers mistakenly said we had reached in the '30's?

The answer is no!

Proof of that answer is being developed through a McGraw-Hill national survey of "Business' Needs for New Plants and Equip-

continued on next page



ment" details of which will be given in this editorial series in coming months.

We have a bigger nation, more people, to serve right here at home. Further we must meet human needs which the war created around the world. Also, we must sustain a world position such as this country never assumed before.

Here are immediate things crying to be done.

1. Business still needs billions to expand production because our country and our needs are growing rapidly. Example: To meet the demand for power, electric utility companies must nearly double their present generating capacity in 10 years. That will cost more than $7.5 billion. To fill increasing needs for oil and gasoline, oil companies must spend at least as much.

2. Business still needs billions to get its plants up to date and overcome wear and tear. Examples: Over half a million of our freight cars, a third of the total, are more than a quarter of a century old. About two-thirds of the looms in the textile industry are more than 20 years old. Half of our coke ovens, basic equipment for iron and steel production, are more than 20 years old, and only half as efficient as modern ovens.

3. Business still needs many billions to do new things in dramatic new ways. Example: Machinery that will cut out 80% of the dirty, dangerous work of mining soft coal has been perfected. A new automobile engine plant will reduce the work that goes into engine-building by three-quarters.

Hundreds of similar things that our scientists and engineers have developed could be cited. They can be found in every industry. They hold immeasurable promise of adding to the abundance of American living. In fact, there is hardly a step along the whole route of industry—from roughing out raw materials to delivering finished goods—where there are not new and better ways of doing things standing ready for general use.

But the crucial question now is: Where is the money coming from to put to work these new and better ways of doing things?

Business has used its own resources so far... profits and reserves. The stock market, where industry traditionally has raised money from people willing to risk their savings, has been limping along, giving business no chance to get enough money on satisfactory terms. *Business now must look primarily to its own earnings for the money to carry out the improvements which are necessary if America is to keep itself strong and efficient.* The next editorial in this series will deal with this new and crucially-important role of profits.

But business can not count on profits alone to do the job. Profits are too uncertain.

From now on finding the money... to put new ideas and new equipment to work... to go ahead with the expansion and improvement that will thwart depression and build industrial strength . . . *calls for the support of all Americans everywhere.*

This comes right down to *you... for at stake is your chance for steady work, for better pay, for new things like television, and for more of the every-day things, like coal and clothing, of better quality and at less cost.*

By helping business get new and better tools, you will help yourself—and you will help build a more sound, more prosperous, better America.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

it's a quick OPEN and SHUT case

FOR BETTER SERVICE CONTINUITY ...WITH WESTINGHOUSE GM CIRCUIT BREAKERS

Pneumatic mechanism with self-contained compressor and reservoir for high-speed breaker operation. Separate AB breaker is supplied for compressor motor.

You get the highest possible degree of service continuity with Westinghouse GM Oil Circuit Breakers. This is because their operation is fast—opening in 5 cycles, reclosing in 20 cycles—with almost instantaneous extinction of the arc. The result: better service continuity . . . improved system stability.

A pneumatic mechanism, pneumatically trip-free in any position and electrically trip-free in the closed position, provides fast, 5-cycle opening. And this same mechanism permits fast reclosing.

Ratings range from 69 to 230 kv, with interrupting capacity up to 5,000,000 kva. For more detailed information, write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-60677

ARE YOUR BREAKERS ADEQUATE FOR TOMORROW'S SHORT CIRCUITS?

In the next three years 15,000,000 kw will be added to American generation systems. Westinghouse can help you keep pace (in some cases) by boosting the interrupting rating of your present breakers... or in developing a planned schedule of replacement to meet today's and tomorrow's peaks.

Westinghouse GM CIRCUIT BREAKERS

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

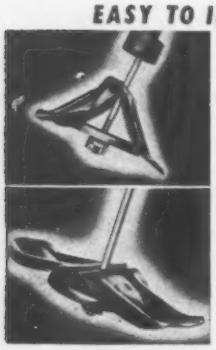
Made in the WEST... for the WEST

P-L*
EARTH ANCHORS
*REA APPROVED

P-L ALL STEEL, EXPANDING TYPE EARTH ANCHORS

Here is the first really efficient, two-piece earth anchor that is of simple, fool-proof, all-steel, heavy-duty construction. P-L Earth Anchors are exceptionally rugged and possess tremendous holding power. P-L Anchors can do a better job and can be installed quicker in all types of soil. Everyone from the engineer to the lineman can appreciate the ease of handling and installation.

EASY TO INSTALL



P-L Anchors come to you as assembled units. Built of two simple pieces of heavy steel plate. A few blows of the tamping bar and the sharp edged blades cut deeply and permanently into solid, undisturbed earth.

FOR LITERATURE WRITE

PIEPER-LILLARD
INCORPORATED
ST. LOUIS 1, MO.

THIS MONTH'S NEWS

USBR Planning Report Sent to Congress

Bureau of Reclamation last month sent to Congress another long-range project planning report.

It is a handsomely printed document listing some 250 irrigation and multipurpose projects. These jobs would require a total investment of $3,891,900,000 in the fiscal years 1948 through 1954, the bureau estimates. Results would include the irrigation of 2,020,000 acres of new land, supply of supplementary irrigation water for another 3,610,000 acres, and addition of 4,324,450 kw. of generating capacity in new and existing federal power plants.

The seven-year report was prepared for the House Public Lands Committee at the request of its chairman, Rep. Richard Welsh, California Republican. The document is less detailed than the ten-year power program prepared by the bureau for its own use only, and it puts more emphasis on irrigation work. The ten-year program (ELECTRICAL WEST, September, p. 138) called for addition of 7,392,600 kw. of new generating capacity at a cost of $1,416,000,000.

Subject to Congressional appropriations, the new report contemplates annual expenditures ranging from $204,200,000 in fiscal 1948 to $781,900,000 in 1953. Actual appropriations for the reclamation program for 1948 totaled $149,136,000.

Increase of the generating capacity of bureau power plants from 2,223,487 kw. to 6,547,337 kw. in the seven-year period would boost annual generation from 13 billion kwh. to more than 30 billion kwh. Gross annual power revenues would jump from fiscal 1947's total of $22,472,000 to $64,000,000 in 1954, the bureau estimates.

● CONTRACT for construction of a $1,000,000 diversion dam on the Gorge hydroelectric project has been awarded by the Seattle Municipal Board of Public Works to the firms of Cascade Contractors and Alton V. Phillips. The concrete gravity dam will replace the existing wood crib structure, which was constructed in 1923, and will increase the head above the Gorge power tunnel about 7 ft., according to E. R. Hoffman, City Light superintendent. The contractors plan to operate on a three-shifts-a-day basis.

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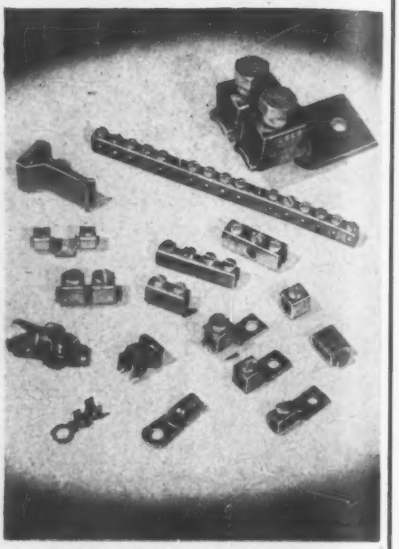

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For Your INFORMATION

THE 17th ANNUAL MANUFACTURERS' DIRECTORY will be published as a separate supplement to the APRIL 1949 issue of ELECTRICAL WEST. It will make available in a handy and convenient form information about Western representatives and Western branch offices.

HEARING CALLED ON COWLITZ DEVELOPMENT

A public hearing on the proposal by the City of Tacoma to construct a $50,000,000 hydroelectric development on the Cowlitz River has been called for Dec. 15 and 16 at Olympia, Wash., by Frank A. Stewart, Washington state director of conservation and development.

Stewart has announced he expects to make a final decision on Tacoma's application for a permit to build a dam at Mossyrock before leaving office Jan. 12. He is an appointee of Gov. Mon C. Wallgren, a democrat, who was defeated for re-election by Arthur B. Langlie, a Republican.

Tacoma already has a permit to build at nearby Mayfield, some 65 miles south of Tacoma, but contends two dams are necessary for a comprehensive development.

The Tacoma City Council has authorized immediate applications to the Federal Power Commission for permits to construct the two dams.

The proposed development is opposed by the state game and fish departments, who contend that no permit should be granted unless satisfactory advance arrangements are made to insure fish runs, and the cities of Longview and Kelso, at the mouth of the Cowlitz.

Fishing interests of northern Oregon and southern Washington have begun an organized drive to get the Washington legislature to declare Cowlitz River a fish sanctuary. The proposed legislation would not affect commercial or sports fishing rights now existing on the river but would forbid construction of stream obstruction that would be damaging to salmon spawning grounds.

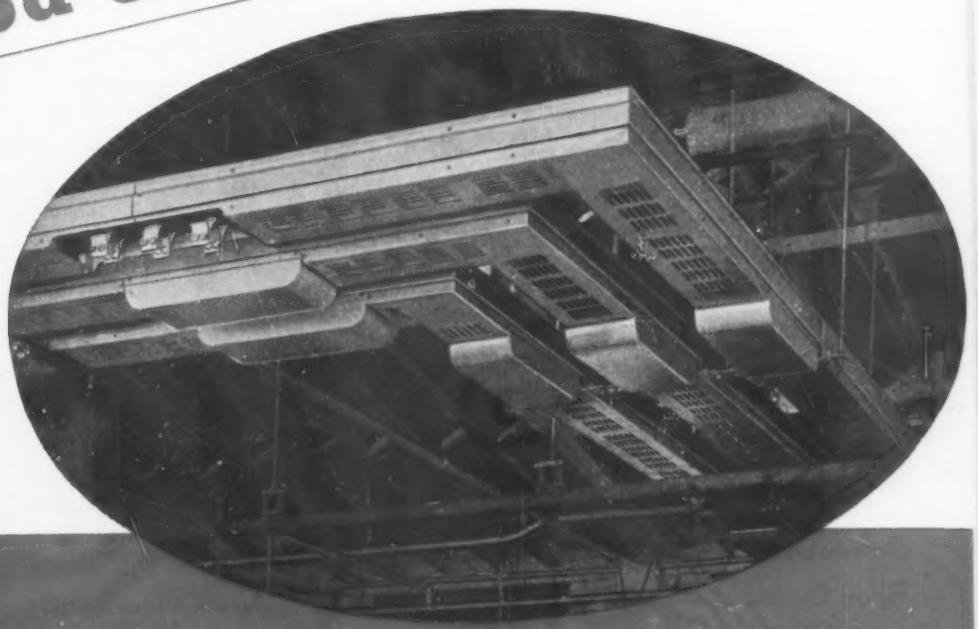
James Bolin, of the Longview, Wash., Chamber of Commerce, told a joint meeting of civic groups of Longview and Kelso, that 147 organizations had been contacted in the campaign to prevent construction of the dam. James Cellars, secretary of the Columbia River Salmon and Tuna Packers Assn., said that the expenditure of $13,500,000 for lower Columbia River fishery rehabilitation will be totally wasted if Tacoma is allowed to build the dam.

● A 400-PAGE BOOK outlining the Department of Interior's report on development of the Columbia River has been released by the USBR regional office at Boise.

● AN ELECTRIC fish screen has been installed by Pacific Power & Light Co. at the intake of its Powerdale hydroelectric plant.

It's good electrical practice...

to use low voltage drop busways for carrying heavy currents long distances.



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MEN WHO OBSERVE THE BEST PRACTICES MAKE IT A PRACTICE TO USE **TRUMBULL**

TRUMBULL (T) ELECTRIC

SEATTLE ASKS LICENSE AMENDMENT FOR DAMS

City of Seattle has filed application with FPC for amendment of the license for its Ross and Diable developments on the Skagit River. The amended license would include the existing Gorge plant with proposed changes and additions, including a new diversion dam. Estimated over-all cost of contemplated changes is $9,554,276.

Additions at Gorge plant would increase capacity from 82,500 to approximately 165,000 hp. The new diversion dam would be located downstream from the existing timber-crib dam and, with flashboards, would raise the forebay elevation from 778 to 786 ft. The city asked the commission to include a provision for future replacement of the diversion dam with a concrete dam that would create about 100 ft. more head.

Design Change to Increase Flood Control at Dam

To provide greater flood control, USBR has changed the design of Hungry Horse Dam, multipurpose development in northwestern Montana, R. J. Newell, regional director, announced last month. An additional discharge outlet will be installed under plans worked out jointly by the bureau and the Corps of Engineers. Newell said that the additional outlet will permit an operation schedule under which the Corps of Engineers could recommend a greater allocation of construction costs to flood control, with resultant reduction in costs to be repaid from sale of power.

Sacramento District Asks Hydro Plant Permit

Sacramento Municipal Utility District has asked FPC for a 24-month preliminary permit for a hydro plant on the American River in California. The proposed development would include a generating plant and facilities to utilize water power of Folsom Dam and reservoir, an authorized federal project. Installed capacity of the plant would be about 75,000 kw., with a probable output of 300,000,000 kwh. annually, it was stated.

● THROUGH A CONTRACT signed with Bonneville Power Administration, the city of McMinnville, Ore., will receive an additional 14,500 kva. of electrical energy for 20 years. This will be in addition to the present power supply of 3,000 kva. of 2,400-volt power and 6,000 kva. of 7,200-volt power. The contract provides for construction of a 30,000-kva. substation that will tie in with the new line of 110-kv. capacity running between McMinnville and Forest Grove and a 57-kv. line from McMinnville to Salem.

B. C. Commission To Build Hydro Plant at Silver Creek

Bids were to close at the end of November for a hydroelectric development at Silver Creek by the B. C. Power Commission. This development includes a 700-hp. unit to serve the town of Hope, and is expected to be in operation by summer.

Erection of a small dam to hold the lake at high level mark is called for, with a power unit located on the creek half a mile below the lake.

Meanwhile, as a temporary measure, the commission is completing a third 300-kw. diesel unit in the town, according to S. R. Weston, commission chairman.

Suggestions of some residents of the district that the B. C. Electric Co. should be allowed to take over the Hope system in order to supply adequate power at cheaper rates were quashed, temporarily at least, by the chairman. He said the commission has no authority to turn over any part of its power system to a private company.

B. C. Electric is reported to have offered power to the Hope area at Fraser Valley rates, which are considerably lower than the prevailing charges. However, to do so it would take over the Hope system which the commission expropriated to public ownership a few years ago.

Weston said the commission could not turn it over to the B. C. Electric under existing law. This would place the commission in the position of taking it from one company and selling it to another.

● A POWER MARKET survey of most of Wyoming and adjacent parts of Colorado and Nebraska has been issued by FPC as Vol. 3 in a proposed five-volume series covering the Missouri River Basin. Copies may be secured from the Division of Publications, Federal Power Commission, Washington 25, D. C., at $1 each. Order number is FPC-P-17.

● A NEW Corps of Engineers district has been established at Walla Walla, Wash. It will have jurisdiction over Corps of Engineers projects in the watershed area east of Umatilla River, an area formerly served by the Portland district.

CONTRACT AWARDED ON DAVIS DAM TRANSMISSION LINE

A contract for partial construction of a 3-phase transmission line project to carry Davis Dam power to central Arizona has been awarded to a four-firm combine by the Bureau of Reclamation. The $2,794,686 contract will cover the erection of transmission towers and footings and clearing rights of way.

The firms are Arizona Sand & Rock Co., Phoenix; United Concrete Pipe Co. and Ralph A. Bell, both of Baldwin Park, Calif., and Stolte Inc., Oakland, Calif. Contract time has been set at 700 days, when Davis power is expected to be available.

The three transmission lines are: a 145-mile stretch from Davis Dam to Prescott in northern Arizona; a 65-mile line between Davis and Hoover dams and a 94-mile link between Prescott and Mesa in central Arizona.

The power will be distributed throughout the state by the Arizona Power Authority whose chairman, M. J. Dougherty, reports 100 prospective purchasers signed for 370,000 kw.

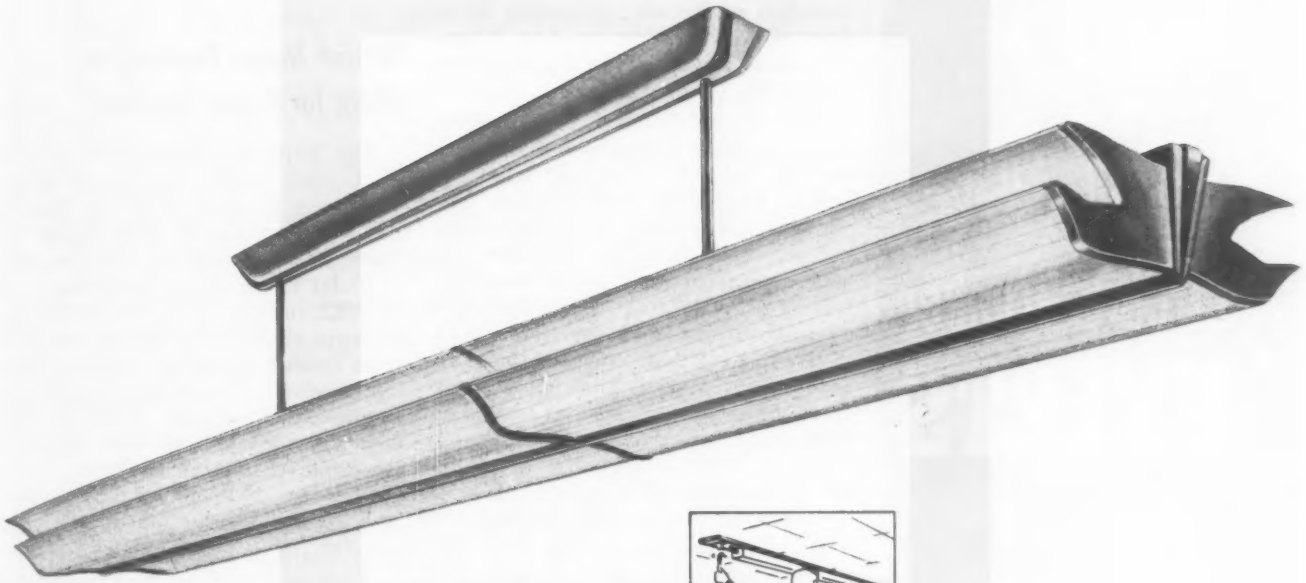
Towers will be 90 ft. high with steel furnished by the American Bridge & Iron Co. All sections will have a capacity of 230 kw. Towers will be spotted on a ¼-mile schedule. Stringing of wire will be under a separate contract. When completed the transmission grid will represent an investment of more than $55,000,000, Dougherty said.

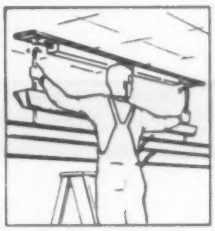
Parallel lines from Parker to Phoenix, a line through Coolidge to Tucson and a line within Arizona from Parker to Yuma already have been completed. Progress on other phases shows the J. & J. Construction Co., Oklahoma City, 92% completed on a 125-mile 115-kw. unit of the Phoenix-Tucson No.2 line at a cost of $475,165, and 22% completed on a line running 129 miles from Parker to Gila at a cost of $1,213,497.

Charles Dorfman Contracting Co. is well along on a $438,139 contract for erection of towers on 70 miles of the Davis-Parker 230-kw. connector line.

● CONSTRUCTION of a 500-ft. lighted aluminum tower, topping a relief model of the state of Washington, has been proposed by the Columbia Basin Commission of the state department of conservation and development. Site of the $2,000,000 project would be on a point overlooking Grand Coulee Dam, object of the display being to show visitors to Coulee other attractions of the state. The tower, to be designed as a monument to electric power, would be equipped with a powerful revolving beacon light.

the VISIONAIRE





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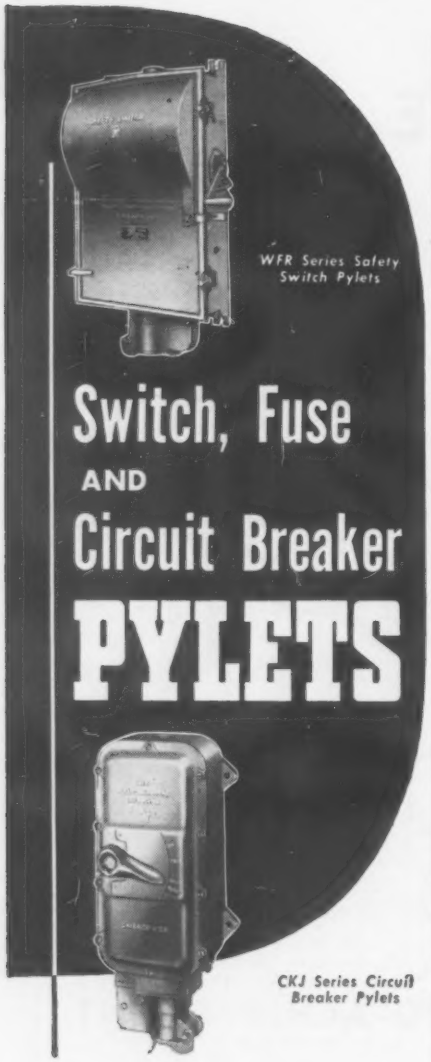
For further information write for Sunbeam's new booklet on the "VISIONAIRE"



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POWER COST QUOTED FOR MAGNESIUM PLANT

Lessees of the big Basic Magnesium plant in Clark County, Nevada, will get electric power for 3 mills per kwh.

The figure was announced by the members of Nevada's Colorado River Commission meeting at Las Vegas, who described it as the lowest power rate in the country.

The state of Nevada has been operating the Basic Magnesium plant since last April under contract with the WAA. The plant now employs 800 workers, but is expected to have a pay roll of 3,000 by 1951. By then the state expects to have signed contracts selling all of the 622,000,000 kwh. per year allotted it from Hoover and Davis dams. Half of these contracts have already been signed and applications from purchasers exceed the supply of power, it is reported.

● Pacific Power & Light plans a construction budget of $8,000,000 for 1949, about the same as in 1948. To provide funds for the program, the company has arranged for short-term loans aggregating $3,500,000 on the company's unsecured notes payable on or before next Aug. 15 at 2½% interest. The company plans to repay the loans by sale of additional bonds under its present mortgage.

● Survey Parties are now exploring the upper reaches of the Similkameen River in British Columbia with a view to possible damming of some of its streams as part of a general control scheme for the Columbia watershed. Water engineers are reported to have discovered locations for several storage sites where water could be impounded at freshet time. They are preparing a report for submission to the International Commission.

● Bert Heggen, Mount Vernon, Washington, president of the Puget Sound Public Utility Districts Assn., was defeated in his bid for re-election as a member of Skagit County PUD Board No. 1. Active in PUD affairs for a number of years, he took a leading part in the plan to purchase the Puget Sound Power & Light Co., which was declared illegal last year by the state supreme court.

● Superior Court Judge Fred Kemp at Wenatchee, Wash., has announced he will issue a certificate of necessity for proposed condemnation of Washington Water Power Co. properties in Chelan County by the Chelan County PUD. Since the power company has announced it will appeal the decision to the state supreme court, however, actual proceedings will be delayed for some time. Judge Kemp made his decision after a four-day hearing. The Chelan PUD recently acquired Puget Sound Power & Light Co. properties in the county by purchase.

District Makes Payment to USBR for Power Contract

The Imperial Irrigation District of El Centro, Calif., has made an advancement payment of $250,086 to the All-American Canal Division of the Bureau of Reclamation at Yuma, Ariz.

Under terms of a contract approved in 1932, repayment by the district was to begin after the canal was completed from funds coming out of power revenue received. The payment made represented accrued net proceeds from power developed from water drops on the canal to January 1947.

● Change in the composition of the State Board of Engineering Examiners is being asked by the Professional Engineers of Oregon. At present the board consists of one electrical, two civil, two mining, two mechanical, and two hydraulic engineers. The proposed reorganization, instead, would provide for a board composed of two electrical, three civil, one mining, two mechanical engineers, and one member at large to be named by the governor. The society recommended an increase in registration fees for engineers of from $15 to $25 and an increase in annual renewal fees from $5 to $7.50. It also was recommended that the limitation on the salary of the secretary of the state board to $3,000 be removed.

● Puget Sound Power & Light Co. was judged as having the best 1947 annual report of the Western utilities industry in the final ratings of an independent board of judges for the *Financial World* Annual Report Survey in New York recently. The bronze "Oscar of Industry" trophy was presented to Frank McLaughlin, president of Puget Sound Power & Light Co., at the annual awards banquet in New York.

● Basic Problems of designing telemetering systems are discussed in a 73-page report prepared by the Office of Technical Services, Department of Commerce. This report, PB 93938, is available in photostat form for $10 or in microfilm for $3.50 from the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C.

What's my Name?

(A 63-second quiz about typical products in our big family of wiring materials.)

1

I never make a bit of noise, yet my smooth, efficient operation results in long service life that is something to shout about. Your customers like to see me in bedrooms, theaters, offices, and many other places where silence and top performance are especially desirable. What's my name?

2

Cost-conscious contractors have found that it is often advisable to use me in place of lead-covered cable for installations in raceways in wet locations. They find that I am easy to install and can use smaller conduit. I really have two names. What are they?

3

Sometimes I wear asbestos, sometimes glass, and sometimes silicone with either glass or asbestos. My core can be round, square or rectangular. You can bend me easily, but I will not crack or rupture. A great many electric products work better and last longer than ever because they have me. Guess who.

4

I am coated inside and out. It's difficult to hurt me with even the toughest treatment. My color is white when I fight atmospheric corrosion, black when I fight chemical action. Many types of boxes and fittings have been designed to go with me perfectly. My name is so well known that it should be easy to identify.

5

I have thousands of parts, of many sizes, types and capacities. I am readily available in any quantity—all from a single source. My parent has the best-known name in electricity. Know what it is?

ANSWERS

1

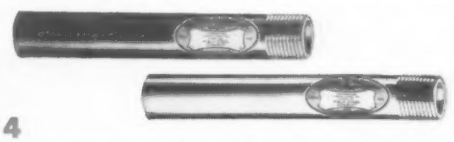
It's General Electric's silent mercury switch, the specification-grade switch that helps you make good wiring better. We'd like to remind you, too, that it is now rated 10 amperes T, at 125 volts to meet today's heavy loads.

2

My name is either G-E *RW* — for rubber-insulated moisture-resistant wire—or G-E *TW*, for thermoplastic-insulated wire of the same type. We suggest you try RW or TW for economy on your next raceway installation in any of the following: (1) underground; (2) in permanently moist locations; (3) in concrete slabs or masonry in direct contact with the earth.

3

The name is one thing upon which good electrical performance depends — *Deltabeston* magnet wire.* It's interchangeable with double-cotton insulated magnet wire, and smart contractors everywhere know that using it is one of the best ways to insure reliable motor service under all conditions.



4

If you've ever used conduit you've probably guessed that these names are *G-E White* and *G-E Black* rigid conduit. They are bywords for high quality wherever conduit is used. The rest of the General Electric line of raceways includes boxes, hangers, fittings, "flex," and EMT—all made to work to the best advantage with one another.

5

The answer should be easy—General Electric's full line of wiring materials. Whatever you need—wire, cable, raceways, wiring devices, fluorescent accessories, of every variety—your best single source of supply for dependable quality is always General Electric. We'll be glad to give you full information on any products in this full line. Just write to Section K8-1225 General Electric Company, Bridgeport 2, Connecticut.

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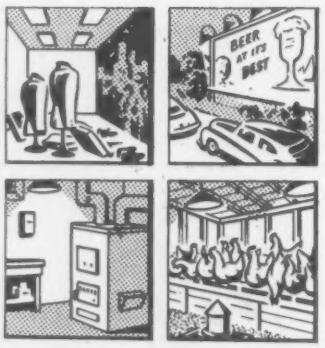

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30 HOUR SPRING RESERVE.
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"But you can't buy that kind of a motor..."

How many times have you heard somebody that ought to know better say something like that about motors, pumps, compressors or what-have-you? And how many times you heard somebody else say, "Oh yes you can! I saw just what we need in Blank Company's ad yesterday."

Advertising pages in this magazine are packed with *news* about your business. They contain information about products and services designed to help *you* do your job quicker, better and cheaper.

To be well-informed about the latest developments in *your* business, *your* industry . . . and to stay well-informed . . . *read all the ads too.*

HEADQUARTERS FOR INDUSTRIAL INFORMATION
McGRAW-HILL PUBLICATIONS

NEWS ABOUT PEOPLE

● D. R. McCLUNG, general superintendent of Pacific Power & Light Co., with headquarters at Portland, has been elected vice-president in charge of physical operations of the company. McClung has been with the company since 1917. In 1936 he was made assistant chief engineer. Four years later he became assistant general superintendent, and in 1947 he was advanced to the general superintendency.

● ANOTHER PP&L promotion makes L. A. MORPHEY superintendent of power, responsible for operation and maintenance of production, transmission and substation facilities. This work formerly was the responsibility of J. H. SIEGFRIED, superintendent of power, and TOM PERRY, superintendent of the Northwest division, both of whom retired recently after years of service. Morphey joined the staff of Northwestern Electric Co. in 1922 and in 1941 was transferred to the power department of Pacific.

● REID GARDNER, president of Arizona Edison Co. Inc., has announced that DOUGLAS B. MCGREGOR is the new vice-president and general manager of the utility. McGregor has been with the company for 18 years.

● C. H. GEORGE, formerly with Puget Sound Power & Light Co., has been named manager of the Chelan County PUD at Wenatchee, Wash., succeeding LEWIS SHREVE, who will continue as consultant to the PUD commission.

● H. A. JOHNSON of San Lorenzo, Calif., has been appointed San Francisco supervisor of the agency and specialties division of Westinghouse Electric Corp., C. H. Wood, division manager of the firm's Pacific Coast district, announced recently.

● L. G. MAECHTLEN has been named general sales manager of the Square D Co., Western division. He has been with the company for a number of years.

● HUGH A. DEWAR has been appointed Pacific Coast sales manager of the pole line hardware division of Oliver Iron & Steel Corp.

● PAUL D. FRAZIER of Pacific Gas and Electric Co. has retired after 48 years of active service in the electrical industry.

● JAMES LIGHTBODY, advertising manager, B. C. Electric Railway Co., Vancouver, B. C., was presented with one of five awards at the annual dinner in Toronto recently of the Association of Canadian Advertisers. Lightbody received the award for outstanding contribution to Canadian advertising.

● L. W. BAILEY has resigned as electrical superintendent for the Weyerhaeuser Timber Co.'s pulp division at Longview, Wash., to enter the electrical contracting business at Kennewick, Wash. He has been succeeded at Weyerhaeuser by C. B. Fahey.

● WILLIAM J. ASHTON, formerly with General Electric lamp division in Oakland, is now a member of the firm of Omer Cox Co., hardware manufacturers agents, San Francisco.

Deaths

● HENRY R. STEVENS, 74, electrical engineer and hydrologist of Bonneville Power Administration, died Sept. 25 at his home in Portland, Ore. From 1928 to 1931 Mr. Stevens directed preliminary reports on development of the river as senior hydroelectrical engineer with the U. S. army engineers in Seattle. He started with BPA as associate in engineering in 1938, and since 1947 had been consultant to the administration.

● HARRY B. READ, 56, manager of Salem Electric, Salem, Ore., died Oct. 9. He was one of the original organizers of Salem Electric.

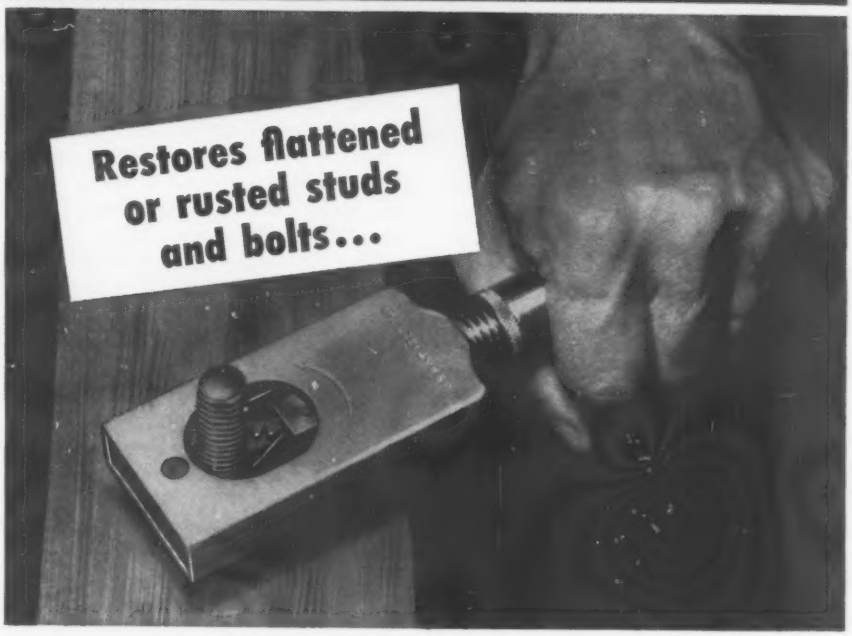
● EMIL C. HEINTZE, 63, retired electrical engineer with Seattle City Light, died recently following a heart attack. He retired five years ago.

● W. R. MARSTON, 60, who had worked on several projects in the Pacific Northwest for the Washington Water Power Co. and West Kootenai Power Co., died Oct. 6 in Monterey, Mexico. He was chief electrical and mechanical engineer of the American Smelting & Refining Co. of Mexico.

● W. LAURIEN HYDE, well-known estimator, charter member of the former Estimators Section of the Los Angeles Electragists and one of the founders of the present Estimators Club of Oakland, employed by the T. L. Rosenberg Co., died as a result of throat infection suddenly, Oct. 29, in Oakland.

● THEODORE H. PIERCE, 46, electrical engineer for the Puget Sound Power & Light Co. of Seattle, Wash., died there Nov. 8.

BUCKINGHAM THREAD CLEANER



NOW — remove rust and recondition damaged threads this fast, simple way. A few quick twists of the Buckingham Thread Cleaner and presto! — the threads are slick and clean. Flats are smoothed-out . . . Nuts spin on and off in a jiffy.

This versatile thread cleaner saves time on field work, too. There's no need to remove a damaged stud . . . no hacksawing or drilling . . . no re-tapping of the hole. Simply slip the tool over the mutilated stud or bolt, tighten the cutting jaws and twist. That's all!

Buckingham Thread Cleaners follow the pitch of any right- or left-hand thread with a root diameter from ¼" to 2 9/16". Separate thread cutting dies are not required — the adjustable cutting jaws of the Cleaner are easily set to the proper size . . . *on the bolt*. Once adjusted, the setting is maintained by the single lock nut on the knurled handle.

Buckingham Thread Cleaners are available in two sizes:

No. 6103 ..... ¼" to 1" root diameter; Weight, 15 Oz.; Price $6.50

No. 6104 ..... 1" to 2 5/16" root diameter; Weight, 2 lbs.; Price $13.00

BUCKINGHAM equipment is sold by over 400 authorized dealers. See the Buckingham Thread Cleaner at the dealer nearest you, or write today for additional information on this versatile, time-saving tool.

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NOTES ON THE TRADE

San Jose Plant Brings Two More G-E Operations West

Bringing two more of its nationwide businesses to the Pacific Coast, General Electric Co. opened its $3,000,000 San Jose, Calif., plant last month. Ultimately the plant will produce all the company's output of single-phase integral horsepower motors, a multi-million dollar business, and will be the source for the vertical motors used in irrigation and certain industrial processing plants, according to H. V. Erben, vice-president and general manager of the apparatus department, who came from Schenectady for the plant dedication on Nov. 18.

At peak production, expected to be reached early next year, the new plant will turn out more than 1,500 motors weekly. These will include single-phase motors and 5- to 500-hp. polyphase motors. Approximately 500 persons will be employed eventually. The 144,000-sq.-ft. building is located on a 57-acre site to allow for expansion.

That the company is deeply interested in the commercial and industrial progress of the Pacific Coast, that it is here to stay, and that its own future is linked with the growth of this area was brought out by Erben in his dedication talk.

"Considering the over-all operations of our company and affiliates, we have invested in the West Coast many millions of dollars for plants, service shops, warehouses and stocks," Erben pointed out. "During the last five years alone our investment has been nearly $10 million. In 1943 our total employment on the Coast was approximately 2,000; today it is 5,000."

As evidence of G-E's confidence in the West, Erben cited operations established here and to come here under the company's decentralization plan. The Ontario, Calif., electric iron plant, opened in 1904, now employs approximately 1,200, makes more than 50,000 electric irons a week, he stated. Other plants on the Coast are the chemical plant opened at Anaheim last year for producing glyptal resins, two apparatus plants and a lamp factory in Oakland, with a combined total of nearly 900 employees.

The Oakland transformer plant will be converted soon to a self-contained unit for the complete manufacture of transformers in the 1½- to 1,000-kva. range, he pointed out. A commercial wire and cable factory has been established in Oakland since the war, and a new industrial control equipment factory will be started there in 1949, he stated.

Trumbull Electric Mfg. Co., wholly owned affiliate, has plants in North Hollywood, San Francisco and Seattle for manufacture of electrical control apparatus and switches; employs about 250. It has been arranged, Erben said, that assembly of special airplane control panels used by West Coast aircraft manufacturers will be done in the North Hollywood plant.

As a further indication of the company's interest in the West, Erben cited the 16 apparatus sales offices in the three Pacific states—seven of them established since the war. Backing up these offices are four major warehouses, service shops at Los Angeles, San Francisco, Portland, Seattle and San Diego, operations employing less than 400 people in 1938 and more than 1,200 today, he pointed out.

● WESTINGHOUSE Electric Supply Co.'s management conference in Seattle was attended by branch managers from the Portland, Butte, Spokane, Tacoma, and Seattle headquarters. Last sessions were presided over by G. I. Hicks, Pacific Coast headquarters representative in charge of market developments, Los Angeles. Attending the sessions were R. P. Grace of Butte, R. H. Sroufe of Portland, E. W. McBratney of Tacoma, H. L. Vincent of Spokane. Seattle's delegation to the conference included William Jewell, district manager; S. J. Stallings, district credit manager; L. D. Pulsifer, district appliance manager; F. H. Luithle, district stores manager; A. L. Wiegenstein, district apparatus manager; A. F. Sheehan, district apparatus promotion manager; Ross McConnell, district appliance promotion manager; J. E. Simpson, district auditor; Paul K. Carlson, district service manager.

● THOMPSON-HOLMES DISTRIBUTING Co. served as host to 150 dealers at a combination dinner and sales meeting in Sacramento at the Hotel Senator recently. Highlight of the meeting was a speech presented by H. B. Payor, vice-president and sales manager of the electric water heater division, Landers, Frary & Clark, New Britain, Conn. The new sales features of the 1949 Universal line were explained to the dealers.

● UNITED STATES STEEL Co. will soon be ready to serve steel users in the Pacific Northwest from warehouses at Portland and Seattle, L. B. Worthington, president of the company's warehousing subsidiary announced recently. Columbia Steel Co. will transfer to the supply company its Portland and Seattle warehouse plants. Clifford W. Lord will be district manager of the two warehouses.

Pictured at opening of G-E's San Jose plant, left to right: C. J. Andersen, superintendent; A. G. Jones, manager, Pacific district, Ab Martin, assistant manager, Oakland Works; H. V. Erben, vice-president and general manager, apparatus department; G. C. Montgomery, newly elected director of G-E and vice-president of Castle and Cooke Ltd.; R. W. Turnbull, commercial vice-president; John Hood, manager, Oakland Works of General Electric Co.

Simplex-ANHYDREX Series Lighting Cables are designed without metallic armors for installation underground, with or without ducts. Construction is simple, consisting of alloy-coated copper conductors, solid or stranded to meet your requirements; ANHYDREX insulation, a moisture-resistant compound of high dielectric strength and long life; and a tough outer jacket of neoprene.

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Simplex-ANHYDREX Series Lighting Cables are available for street, airport, park, and industrial lighting circuits. They are part of the ANHYDREX Parkway group which also includes cables for underground service entrance, distribution networks, telephone, signal, and control systems. Write us direct or contact our representative in your area for detailed information.

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PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

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C. P. CLARE & CO., Chicago, Ill.—E. I. Berman, San Francisco.
ELECTRIC PRODUCTS CO., Cleveland, Ohio—Hubert Kaub & Co., Denver, Colo.
PHILLIP FREEMAN CO. INC., New York, N. Y.—Max Levin, Los Angeles.
FRIGIDAIRE DIVISION, General Motors Corp., Dayton, Ohio—Sunset Electric Co., Spokane.
HAMILTON MFG. CO., Two Rivers, Wis.—Covington Distributing Co., Houston, Texas; Ironers Inc., Salt Lake City, Utah, and Phoenix, Ariz.
HARMIC MFG. CO., Somerville, Mass.—Roy J. Holsclaw, Denver, Colo.
HOFFMAN RADIO CORP., Los Angeles—Home Appliances, Portland, Ore.
IDEAL INDUSTRIES INC., Sycamore, Ill.—John H. Maddox, San Francisco.
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KNAPP-MONARCH CO., St. Louis, Mo.—Arthur A. Haven Co., Los Angeles.
KULKA ELEC. MFG. CO. INC., Mt. Vernon, N. Y.—McLoughlin Co., Los Angeles.
LANDE CO.—Mark S. Salmon, San Francisco.
LIONEL CORP.—Mike Sweyd, San Francisco.
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MOBECO INC., Watertown, Mass.—Howard B. Winsor, San Francisco; Electrical Products Cons., Seattle and Denver.
PATTERSON SHADE CO.—Lloyd Levy Co., San Francisco.
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SILVRAY LIGHTING INC., New York, N. Y.—C. T. Bakeman & Associates, San Francisco.
SOLAR ELECTRIC CO., Chicago, Ill.—Joseph M. Smith, Los Angeles; J. B. Stuart, Dallas, Texas.
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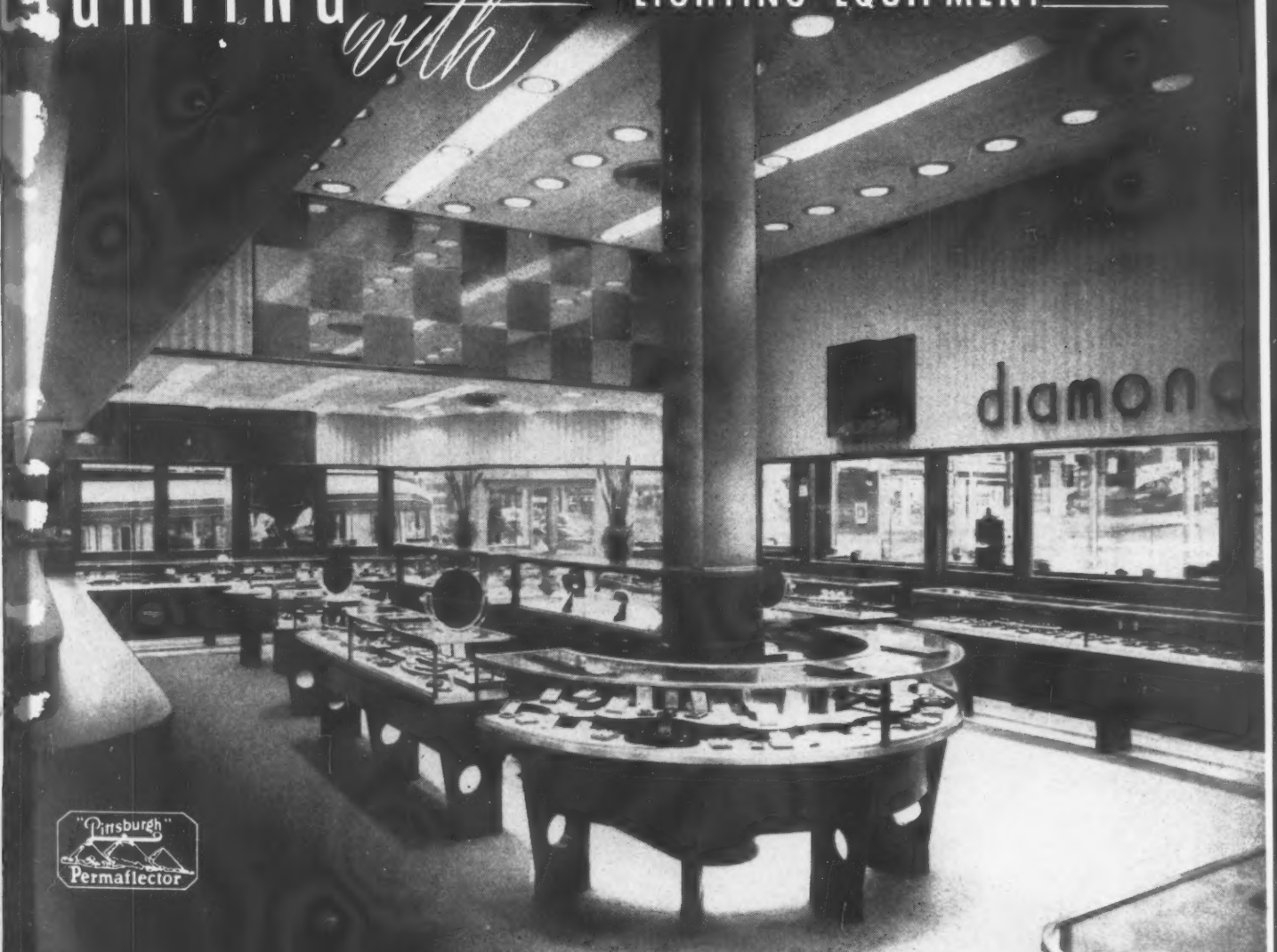

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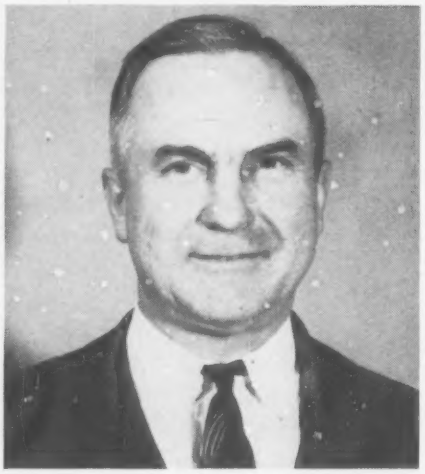
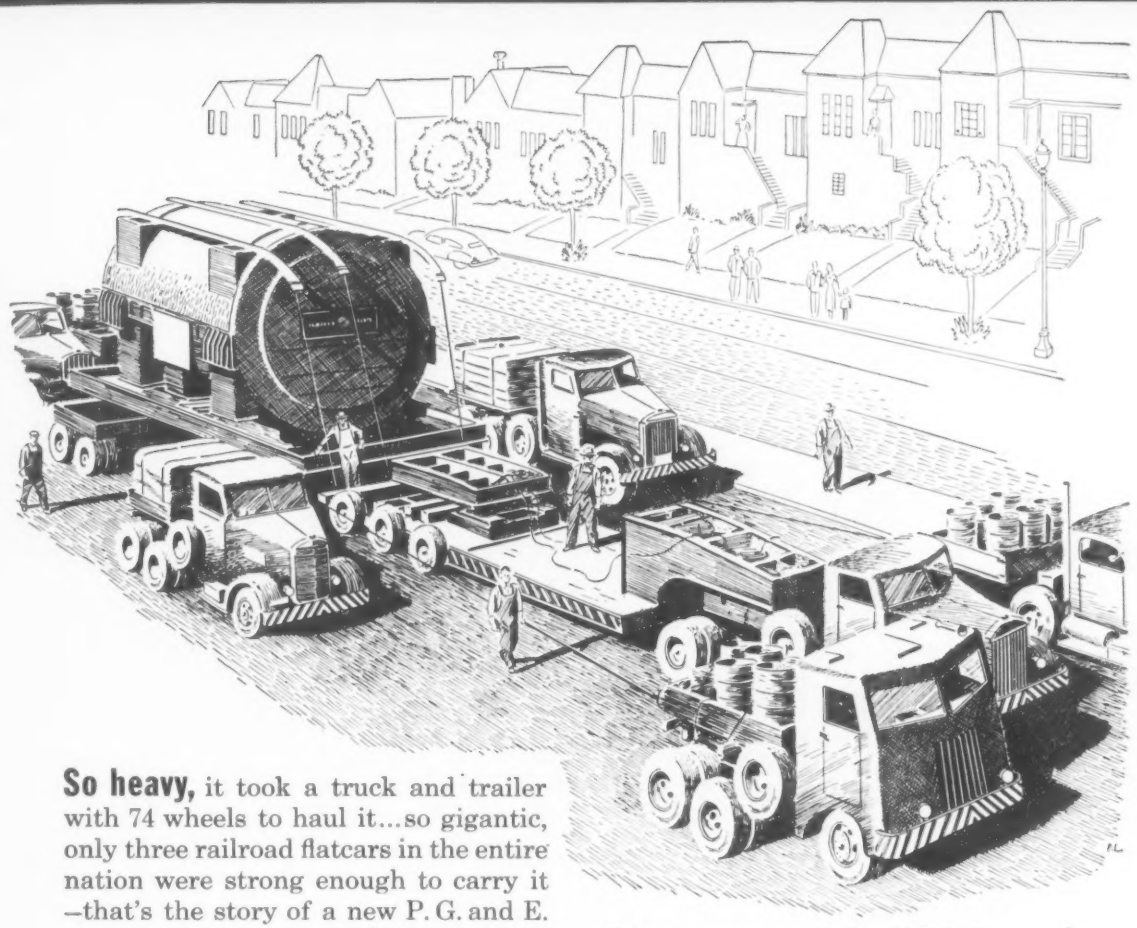


D. R. McClung (above) was named a vice-president and L. A. Morphey (above left) was made superintendent of power, Pacific Power & Light Co.

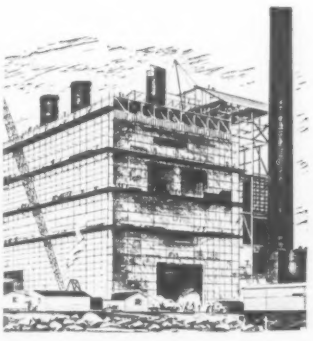
Lem R. Boulware, employee relations vice-president of General Electric, on tour of its Western plants, told San Francisco Electric Club (left) what employees want of their jobs and how a management improvement program and education program is being run

T. L. Rosenberg, vice-president, District 6, NECA, speaking. Beside him are E. R. Cornish, field representative and W. B. Baker, president, San Francisco Electrical Contractors Assn., host to the recent preconvention meeting

One of nation's heaviest freight loads for P·G·and E· power project



So heavy, it took a truck and trailer with 74 wheels to haul it...so gigantic, only three railroad flatcars in the entire nation were strong enough to carry it —that's the story of a new P. G. and E. generator armature which soon will be helping turn out 149,000 electrical horsepower for Northern and Central California. One of the biggest ever built, this armature weighs 356,000 pounds (178 tons) and is 24 feet long, 12½ feet high. You see it here on the last leg of a 3,000-mile journey from the East.



Its destination was P. G. and E's Station "P" at Hunters Point in San Francisco, now being expanded to a capacity of 360,000 horsepower as just part of America's biggest power building program.

Due on the line within the next few weeks, the new generators at Station "P" will bring our total additional power since V-J Day to more than half a million horsepower. And still more is on the way!

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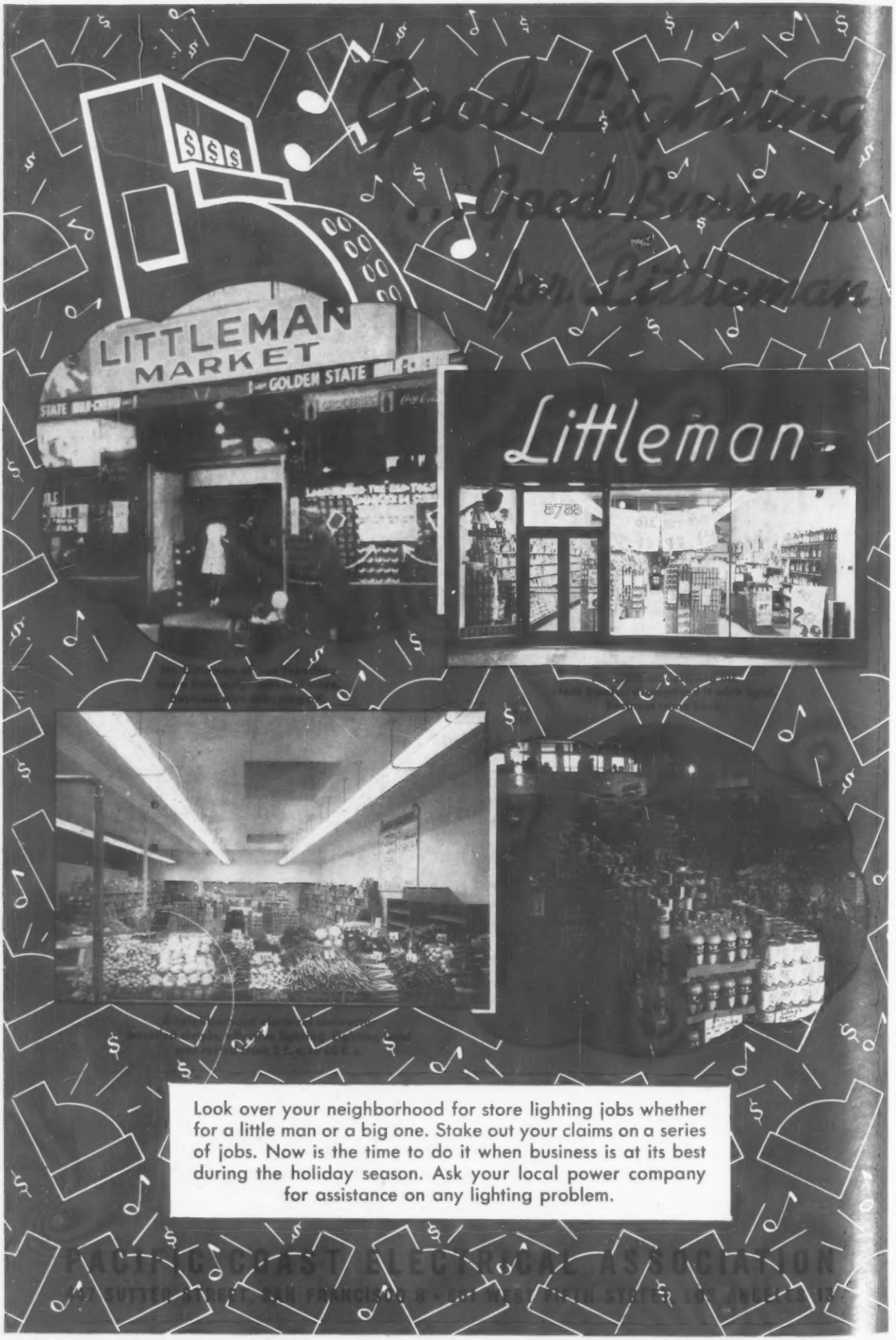

Look over your neighborhood for store lighting jobs whether for a little man or a big one. Stake out your claims on a series of jobs. Now is the time to do it when business is at its best during the holiday season. Ask your local power company for assistance on any lighting problem.

PACIFIC COAST ELECTRICAL ASSOCIATION

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